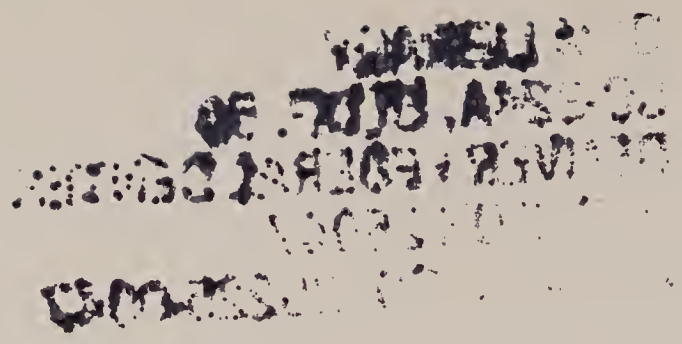
U.S. Department of the Interior/Minerals Management Service

Managing Oil and Gas Operations on the Outer Continental Shelf



Managing Oil and Gas Operations on the Outer Continental Shelf

U.S. DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
September 30, 1986

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WASHINGTON, DC 20240

Foreword

Oil and gas resources on the Outer Continental Shelf belong to the people of the United States who, through their Government, lease the right to explore and develop those resources. The leasing of the acreage and the regulation of drilling and production activities on those leases are controlled by the Federal Government through one of its Agencies, the Minerals Management Service. This publication provides the owners of those resources—the American people—with information about how their resources are managed. More particularly, it provides information about regulatory processes and the way operations are managed. It is addressed to those who have some familiarity with oil-field terminology.

This booklet describes activities following a lease sale, from plan review and approval, through drilling and production, to lease relinquishment. It is a summary of the Minerals Management Service's involvement in oil and gas operations on the Outer Continental Shelf.

The procedures and practices described in this publication are based on the Outer Continental Shelf Lands Act and the following three documents derived from that Act: regulations, Orders, and Notices to Lessees and Operators. All the requirements imposed on lessees which are in these three documents are proposed to be incorporated into one regulatory package. That proposal is now underway.

I hope this booklet will provide you with the information you seek concerning the management of oil and gas operations on the Outer Continental Shelf.

Wm D Bettenberg

Director
Minerals Management Service

September 30, 1986

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Illustrations

Chapter 1. Introduction

A. The OCS Lands Act and the Minerals Management Service

Managing oil and gas operations on the Outer Continental Shelf (OCS) is guided by the OCS Lands Act of 1953 and its amendments. Although other Federal Agencies, for example, the U.S. Coast Guard (USCG) and the U.S. Army Corps of Engineers (COE), have responsibilities under the Act, the Department of the Interior (DOI) carries out most of the Act's provisions. This publication focuses on the activities of DOI, specifically the oil and gas operations program of the Minerals Management Service (MMS).

B. The Minerals Management Service and its Programs

Formed in 1982 from parts of the Bureau of Land Management (BLM), the U.S. Geological Survey (USGS), and the Office of OCS Program Coordination, MMS is charged with leasing oil and gas and other mineral resources on our Nation's OCS. The MMS operates the following four regional offices:

1. Alaska OCS Region (for the OCS off Alaska),
2. Atlantic OCS Region (for the OCS along the east coast),
3. Gulf of Mexico OCS Region (for the OCS in the Gulf of Mexico), and
4. Pacific OCS Region (for the OCS along the west coast and off Hawaii).

In addition to regional offices, MMS operates an Office of Strategic and International Minerals located in Long Beach, California, which is responsible for developing a program to lease strategic, critical, and other nonenergy minerals on the OCS. (The authority to lease minerals other than oil, gas, and sulphur is found under section 8(k) of the OCS Lands Act.) This office is working with several States through joint Federal/State task forces to develop a case-by-case, environmentally safe leasing program which will provide the United States with strategic and critical minerals and reduce our Nation's dependence on unstable foreign sources. A number of environmental and resource studies are in progress to develop a sound leasing program. The Office of Strategic and International Minerals will publish reports on the leasing and management of strategic, critical, and other nonenergy minerals as their focus develops.

Besides the OCS leasing program, MMS has a responsibility for managing revenues. The Associate Director for Royalty Management is responsible for collecting, accounting, and disbursing of Federal mineral revenues from all Federal leases including those received from lessees of onshore lands. The annual report of royalty management activities is listed in Selected MMS References, page 52.

C. Other Publications

The MMS has a companion publication entitled "Leasing Energy Resources on the Outer Continental Shelf" which describes procedures leading up to an actual lease sale. Although some of the same information is repeated, each publication has a different theme.

Other MMS publications concerning the OCS are listed in Selected MMS References. A glossary of terms and abbreviations is also included at the back of this publication.

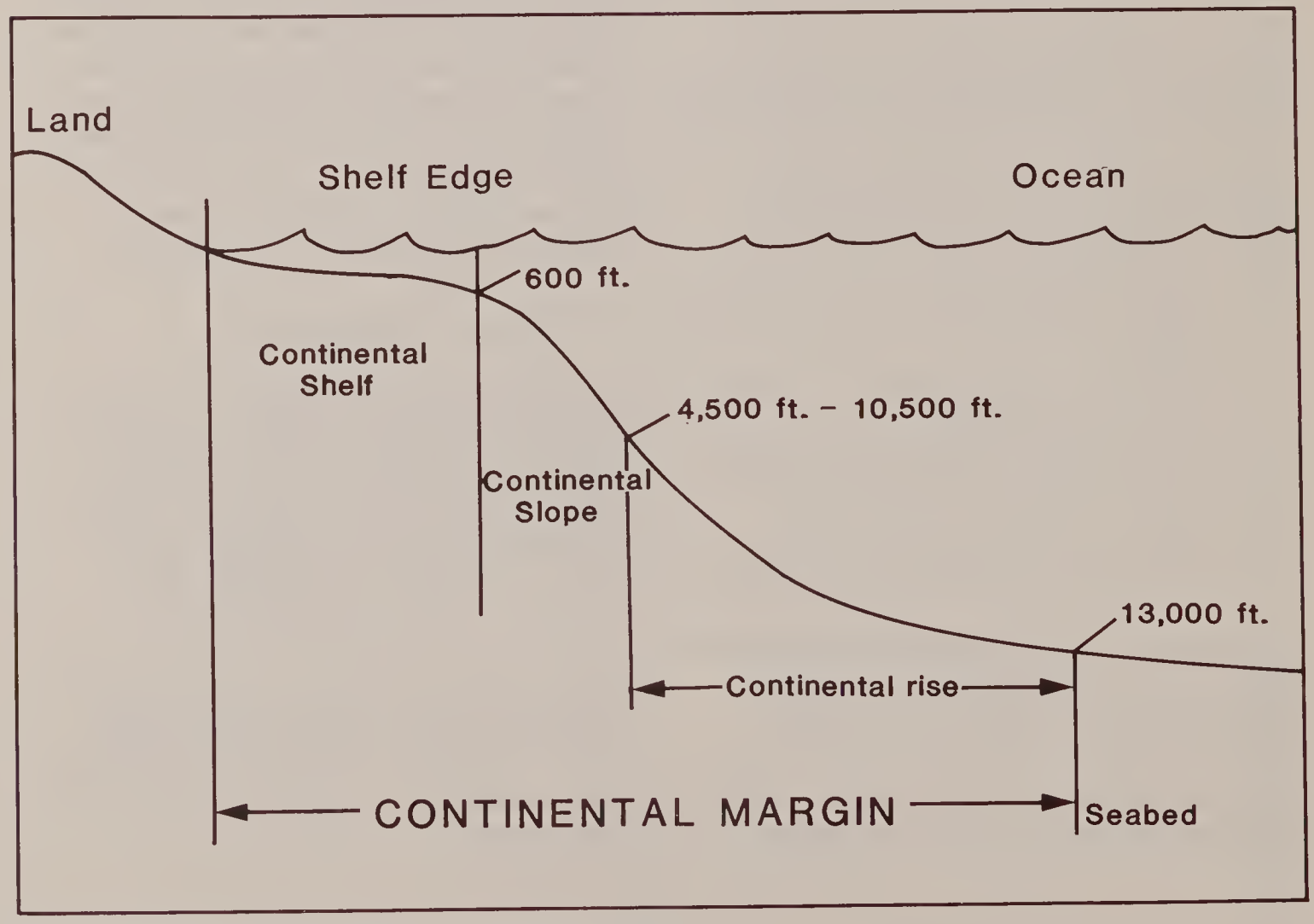
Chapter 2. Background

The MMS is involved in managing oil and gas operations on Federal lands of the continental shelf. A description of the shelf and the history of oil and gas development follow.

A. Location, Description, and Extent of the Continental Shelf

1. *Location and Description.* Under the 1958 Geneva Convention on the Continental Shelf, the shelf is described as those submerged offshore areas lying seaward of the territorial sea to a depth of 200 meters (656 feet) and beyond that area to that depth which admits of mineral exploitation of natural resources. The term "continental shelf" is distinct from the term "Outer Continental Shelf" which has no scientific definition. The term "Outer Continental Shelf" is a legal term created by Federal statute—the OCS Lands Act. The extent of Federal jurisdiction over the OCS is determined by that Act which is described in the chapter on statutory authority (page 5). (Federal jurisdiction is not confined to the 200-meter contour.)

2. *Extent.* The contour, configuration, and extent of the continental shelf vary from one coastal area to another. The shelf is relatively narrow along the Pacific coast, wide along much of the Atlantic coast and the Gulf of Alaska, and widest in the Gulf of Mexico and around western and northwestern Alaska. The submerged seaward extension of a continent is the continental margin. In most areas, this submerged extension is composed of the gently sloping continental shelf, the steeper gradients



NOTE: Depths and gradients are approximate.

FIGURE 1. *Generalized profile of the continental margin.*

FIGURE 2. *Summerland Oil Field, California, in the late 1800's*

of the continental slope, and the continental rise. Figure 1 shows a generalized profile of the continental margin.

B. History of Offshore Petroleum Development

The development of offshore oil and gas resources began in the late 1880's. In 1896, 38 years after the first oil well was drilled onshore in Titusville, Pennsylvania, an offshore well was drilled off the coast of Summerland, California. Natural oil and gas seeps observed along the seashore at low tide encouraged further development. Additional wells were drilled from piers generally 300 to 500 feet long. The longest pier stretched 1,230 feet into the water. Approximately 400 wells were drilled in this manner—some producing from as deep as 600 feet below sea level. (Figure 2).

1. *Discoveries and Advancements.* The 1938 discovery of the Creole field, 1½ miles from the Louisiana coast in the Gulf of Mexico, marked the petroleum industry's first successful venture into open, unprotected waters. The discovery well was drilled from a 100- by 300-foot drilling platform secured to a foundation of timber piles set in 14 feet of water. In November 1947, a well was drilled almost out of sight of land. It was completed in 16 feet of water in the Ship Shoal area, approximately 12 miles south of Terrebonne Parish, Louisiana. This well was the first to be drilled in open water from a fixed platform/drilling tender combination—a major breakthrough in drilling-unit design for offshore use.

In the search for oil and gas in offshore areas, industry has continually extended and improved drilling and production technology. The technology used today for exploration and production of petroleum in deeper water illustrates these advancements. Conventional steel-jacketed production platforms stand in as much as 850 feet of water off southern California and in 1,025 feet of water off the Louisiana coast. In 1983, a compliant guyed-tower production platform was installed in 1,000 feet of water 110 miles southeast of New Orleans, Louisiana. In 1984, the drillship, Discoverer Seven Seas (Figure 3), drilled an exploratory well in 6,952 feet of water off the

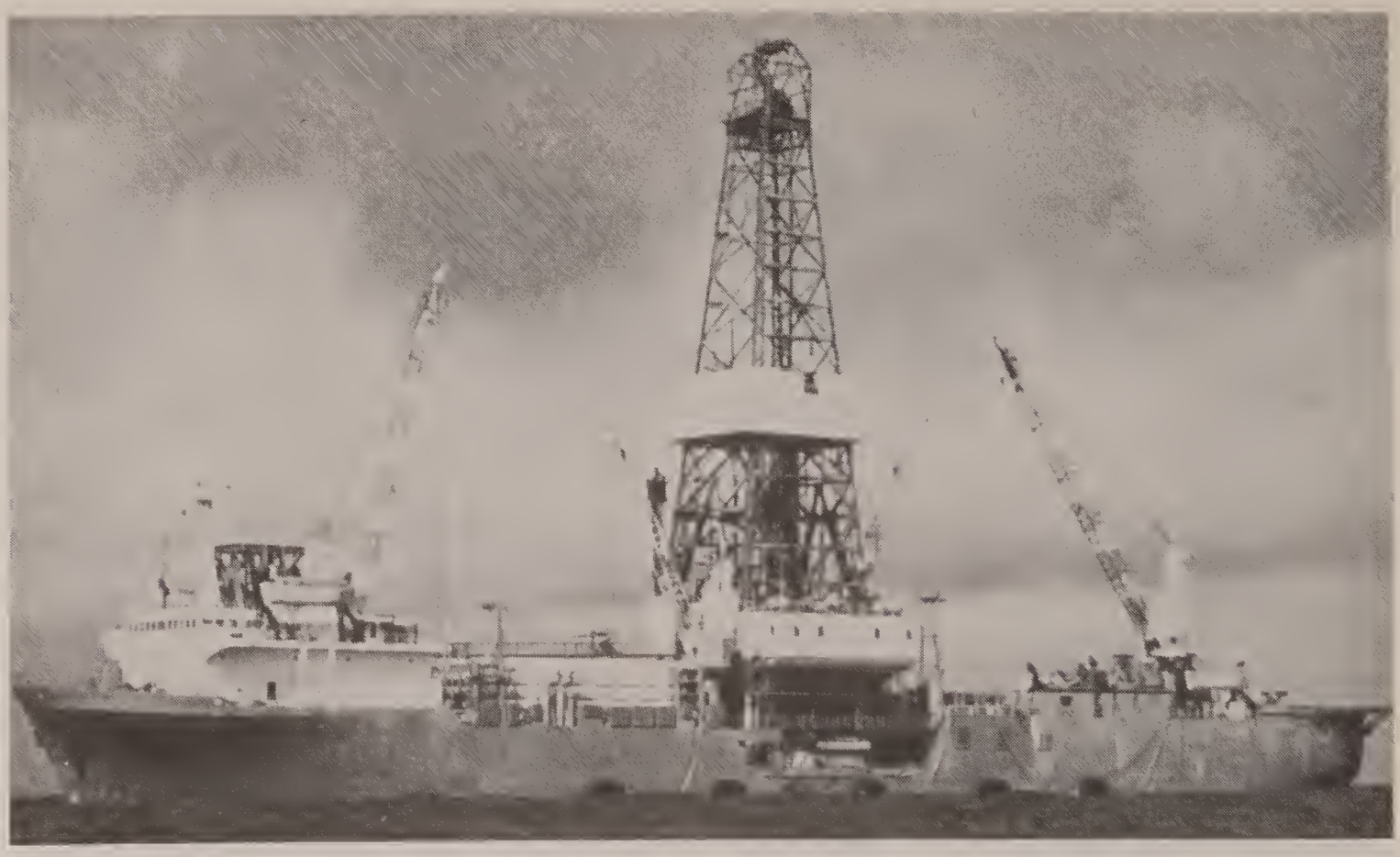


FIGURE 3. *Drillship, Discoverer Seven Seas*

coast of New Jersey. In shallow arctic waters, offshore structure technology has evolved from artificial gravel islands to specially designed caisson-retained islands and ice-resistant mobile units. See figure 29 on page 48 which illustrates these designs. These advancements in offshore drilling and production technology have allowed additions to be made to domestic oil and gas resources.

2. *Federal Leasing.* The OCS lands are leased by the Federal Government to industry which explores for, develops, and produces oil and gas. The leasable area currently involves the submerged land generally 3 geographical miles from a State's coast to a line about 200 to 300 miles offshore.

Since Federal leasing began in 1954 through 1985, over 420 million acres have been offered for lease, of which about 41 million have actually been leased. From these leases, industry has produced 7.1 billion barrels of oil and 70.7 trillion cubic feet of gas. Cumulative totals show that over 95 percent of the oil and over 99 percent of the gas produced from the OCS came from the Gulf of Mexico; however, that long-term trend is changing. For example, during calendar year 1985, 9 percent of the Federal offshore crude oil came from offshore California. It is expected that development and production will increase in that area. Exploration efforts continue offshore Alaska and the Atlantic coast States.

About 12.6 percent of the Nation's domestic oil production came from the OCS in Fiscal Year (FY) 1985 as did about 25 percent of its natural gas. The Federal Government has received, on behalf of the people of the United States, more than $81 billion in bonuses, royalties, and rentals through 1985 from the OCS leasing program. Approximately $5.0 billion of this was received in 1985 alone. This source of Federal revenue is second only to collections by the Treasury Department.

3. *Environmental Record.* The environmental record for oil production on the OCS is impressive. Of about 5 billion barrels produced in the last 15 years, through 1985, only about 61,000 were spilled. (Statistics are for spills of 50 barrels or more.) Over 24,000 wells were drilled, yet only one blowout occurred that resulted in significant amounts of oil reaching shore (off Santa Barbara, California, in 1969). Major steps have since been taken to require more stringent regulatory safeguards to promote even safer, pollution-free operations.

Chapter 3. Statutory and Regulatory Authority

The authority for managing oil and gas operations stems from the authority vested in the Congress by the Constitution to manage public property. Congress has delegated its authority through specific legislation. A description and the history of the development of that authority follows.

A. Laws

Jurisdiction over the continental shelf is divided between the coastal States and the Federal Government. The States manage the mineral resources off their immediate coasts. The MMS manages the mineral resources in the area under Federal jurisdiction, an area commonly referred to as the OCS.

The formal division of responsibility evolved gradually. As interest in offshore resources began to grow, questions regarding the division of jurisdiction between coastal States and the Federal Government had to be resolved. In 1947 and 1950, the U.S. Supreme Court upheld the position of the Secretary of the Interior which was that the Federal Government, not the States, possessed full power over the lands and natural resources in the submerged land areas seaward of the coasts of the United States.

In response to public concerns about the ownership and development of offshore resources, Congress, in 1953, enacted two laws—the Submerged Lands Act and the OCS Lands Act. These laws granted certain offshore lands to coastal States. They also provided a framework for regulating and managing the exploration, development, and production of oil, gas, and other minerals of the seabed beyond the area managed by the coastal States—the OCS. The two acts are described below.

1. *The Submerged Lands Act.* The Submerged Lands Act of May 22, 1953, granted the coastal States jurisdiction over a belt of submerged lands seaward of their coastlines to a distance of 3 geographical miles. A greater distance from shore (about 9 geographical miles or 3 marine leagues) was granted to Texas and Florida (west coast only) because these States had established their jurisdiction over the larger area before achieving statehood. The Submerged Lands Act reaffirmed that natural resources of the seabed and subsoil beyond those granted to coastal States would be subject to the jurisdiction of the Federal Government for the benefit of the entire Nation.

2. *The Outer Continental Shelf Lands Act and its Amendments.* The OCS Lands Act of August 7, 1953, authorized the Secretary of the Interior to grant mineral leases and to prescribe regulations governing oil and gas activities on OCS lands. The OCS Lands Act defines the OCS as ". . . all submerged lands lying seaward and outside of the area of lands beneath navigable waters as defined in section 2 of the Submerged Lands Act and of which the subsoil and seabed appertain to the United States and are subject to its jurisdiction and control." The pertinent provision of the Submerged Lands Act defines "navigable waters" as ". . . all lands permanently or periodically covered by tidal waters up to but not above the line of mean high tide and seaward to a line three geographical miles distant from the coast line of each such State and to the boundary line of each such State where in any case such boundary as it existed at the time such State became a member of the Union, or as heretofore approved by Congress, extends seaward (or into the Gulf of Mexico) beyond three geographical miles . . ."

The OCS Lands Act established the importance of developing the mineral resources of the continental shelf in an expeditious and orderly manner. The Act also recognized the need for safely conducting oil and gas operations and using technology and procedures intended to minimize the likelihood of blowouts, fires, spills, and interference with other uses of the offshore waters.

The Act was amended on September 18, 1978, and those amendments had the following major purposes:

a. To establish policies and procedures that expedite exploration and development on the OCS in order to achieve national economic and energy goals, assure national security, reduce dependence on foreign sources, and maintain a favorable balance of payments in world trade;
b. To balance orderly energy resource development with protection of the human, marine, and coastal environments;
c. To ensure the public a fair and equitable return on the resources of the OCS;
d. To encourage development of new and improved technology in order to eliminate or minimize risk of damage to the human, marine, and coastal environments;
e. To assure that affected States and, through States, local governments have timely access to information regarding OCS activities and opportunities to review, comment, and participate in policy and planning decisions;
f. To establish an oil-spill liability fund; and
g. To establish a fishermen's contingency fund.

The Act was amended again in 1986 by the "Outer Continental Shelf Lands Act Amendments of 1985." Included in the provisions of this amendment are the following:

a. The distribution of a portion of the receipts from the leasing of mineral resources of the OCS to coastal States. As provided under section 8(g) (of the Act), 27 percent of the receipts from the area within a 3-mile zone adjacent to State lands is to be distributed to affected coastal States. The funds may be used for the mitigation of adverse economic and environmental effects related to the development of such resources.

b. A schedule for the distribution of funds in the section 8(g) account to affected coastal States of revenues received as a result of leasing activity from September 1978 through October 1, 1985; and a formula for the distribution of additional payments to be made for leasing activity occurring after October 1, 1985.

The OCS Lands Act Amendments of 1985 also amended the Submerged Lands Act by adding language addressing the immobilization of boundaries between a State and the United States when the coordinates of the boundaries are fixed under a final decree of the Supreme Court.

3. *Other Laws Which Govern the OCS.* Leasing and operations activities on the OCS are also subject to the requirements of some 30 other Federal laws administered by numerous Federal Departments and Agencies. Among them are the following:

National Environmental Policy Act (NEPA) which establishes requirements for preparing environmental assessments and environmental impact statements (EIS) for major Federal actions that could significantly affect the quality of the human environment.

Endangered Species Act which requires that Federal Agencies ensure that their actions are not likely to jeopardize the continued existence of any threatened or endangered species.

Coastal Zone Management (CZM) Act, as amended, which provides for State review of exploration plans and development and production plans that affect the land and water use of the coastal zone. The Act also requires consistency of relevant activities in those plans with approved State coastal management programs.

Federal Water Pollution Control Act (commonly known as the Clean Water Act) which requires that in-water discharges of pollutants generated by OCS operations comply with the limitations and restrictions that are included in an applicable National Pollutant Discharge Elimination System (NPDES) permit.

Ports and Waterways Safety Act which protects navigational safety.

Marine Mammal Protection Act which provides for protection of marine mammals.

Clean Air Act which establishes national ambient air quality standards.

National Historic Preservation Act, as amended, which provides for the protection of historic and prehistoric archaeological resources.

B. Regulations

The MMS administers the provisions of the OCS Lands Act, as amended, through regulations found at Title 30 of the Code of Federal Regulations (CFR), Chapter II. The regulations govern leasing and operations on the OCS. They provide for public participation in the leasing process, including the review by and coordination with State governments, consideration of State CZM programs, and the solicitation of information from the public concerning proposed lease sales through a "call for information and nominations." In addition, the regulations provide for royalty payments, environmental studies, and consultation with appropriate Federal and State agencies to develop measures to mitigate adverse effects on the environment.

The regulations require industry to submit an exploration plan to MMS which includes measures to protect the environment. The MMS reviews the plan, analyzes the environmental effects, and determines appropriate mitigating measures before approving the plan. The regulations also require industry to submit a development and production plan before development can take place. The MMS approves the plan taking into account environmental, technical, and economic considerations. Many other elements of leasing and operations are covered in the MMS regulations which reflect the mandates of the OCS Lands Act, as amended.

Other Agencies in addition to DOI regulate specific aspects of leasing and operations. For example, the Environmental Protection Agency (EPA) regulates waste discharges; the Department of Transportation (DOT) regulates occupational safety and health, the reporting and containment of oil spills, and the design of pipelines and mobile offshore drilling units; and the COE regulates the placement of structures.

C. Orders, Stipulations, Notices, and Conditions of Approval

1. *OCS Orders.* The MMS issues OCS Orders which govern most of the day-to-day drilling and production operations on leases. The OCS Orders establish specific requirements for performing various types of oil and gas operations which include drilling, production, well abandonment, pipeline transportation, and other important offshore oil and gas activities.

Although OCS Orders are separate documents from the regulations, they are considered part of the regulatory framework. The MMS is currently studying its regulatory program and is proposing to incorporate all the requirements in the OCS Orders into a single set of regulations.

Separate OCS Orders have been issued for each OCS Region, although they usually specify common requirements. The requirements, however, can be modified or expanded to accommodate regional differences. This is particularly true for the Alaska OCS Region where permafrost, ice cover, isolated locations, subfreezing temperatures during much of the year, and severe oceanographic conditions complicate oil and gas operations.

2. *Stipulations.* Special stipulations are often included in OCS oil and gas leases in response to concerns raised by coastal States, fishing groups, Federal Agencies,

and others. The stipulations may require biological surveys of sensitive seafloor habitats, environmental training for operations personnel, special waste-discharge procedures, archaeological resource reports to determine the potential for historic or prehistoric resources, special operating procedures near military bases or their zones of activity, and other restrictions on OCS oil and gas operations. Lease stipulations are legally binding, contractual provisions.

3. *Notices to Lessees and Operators.* Notices to Lessees and Operators (NTL's) are used to quickly notify operators within a particular OCS Region concerning changes in MMS administrative practices or procedures for complying with rules, regulations, and lease stipulations. The NTL's themselves do not impose new requirements on lessees.

4. *Conditions of Approval.* Conditions of approval are often attached to approved permits such as applications for permit to drill, deepen, or plug back (APD). These conditions range from administrative matters, such as the required frequency and number of reports, to technical or environmental conditions such as requirements for the disposal of drilling mud. In all cases, they are specific conditions that amplify or explain a requirement in the regulations, lease stipulations, or OCS Orders.

D. Presidential Proclamation on the Exclusive Economic Zone

On March 10, 1983, a Presidential Proclamation established an Exclusive Economic Zone (EEZ) of the United States of America. The EEZ extends seaward 200 nautical miles from the "baseline" (the legal coastline) of the territorial sea of the United States, the Commonwealths of Puerto Rico and Northern Mariana Islands, and other U.S. overseas territories and possessions. The EEZ extends over 3 billion acres subject to U.S. jurisdiction.

Within the EEZ, the United States has sovereign rights, to the extent permitted by international law, to explore, exploit, conserve, and manage natural resources, both living and nonliving, of the seabed and subsoil. The Secretary of the Interior is authorized by the OCS Lands Act to manage the leasing of oil and gas within the EEZ contiguous to the 50 States.

Chapter 4. Leasing Summary

The following summary provides a brief description of the process of leasing OCS lands. A detailed description is provided in the publication "Leasing Energy Resources on the Outer Continental Shelf."

The OCS leasing program is scheduled over 5-year periods. The current 5-year offshore oil and gas leasing program was approved by the Secretary of the Interior on July 21, 1982. It was designed to increase the quality and pace of sales and achieve early leasing of high-potential areas while safeguarding the environment as mandated by the OCS Lands Act Amendments of 1978. The July 1982 program provided for 41 sales from 1982 to 1987. A new 5-year program for 1987 through 1991 is now under review.

An important part of the OCS leasing program involves environmental studies. These studies are used to gather and develop information needed to predict, assess, and manage the impacts of OCS oil and gas leasing activities on the human, marine, and coastal environments. From 1978 through 1985, over $400 million was invested in environmental and socioeconomic studies.

A geological report is prepared for each proposed sale area. The report includes the general geology of the planning area and the hydrocarbon potential, environmental geology, and potential geologic hazards of the sale area. The area of hydrocarbon potential is identified before a call for information and nominations is published. The MMS analyzes each specific sale area for hydrocarbon resource potential. The area of hydrocarbon potential is outlined in the call and serves as a basis for focusing comments in response to the call.

The call for information and nominations is published in the *Federal Register* for the purpose of requesting information from potential bidders. The MMS requests that the potential bidders indicate areas of leasing interest within a particular planning area. Comments are solicited from all interested parties on possible environmental effects and use conflicts in the area.

A notice of intent to prepare an EIS, published along with the call, describes the proposed action and initiates the "scoping process" by inviting Federal Agencies and State and local governments and the potentially affected public to provide information and comments which will aid the MMS in determining the significant issues and alternatives to be evaluated in the EIS. Meetings concerning scoping may also be held in the sale area.

The area that will be made available for leasing is determined by analyzing the interest received from industry, the area of hydrocarbon potential identified by MMS, and the comments received. The area identified is then approved by the Assistant Secretary - Land and Minerals Management and will constitute the proposed leasing action in the EIS.

A draft EIS, which focuses its analysis on the area identified, is then prepared. Alternatives considered in the draft EIS include delaying the sale, cancelling the sale, and deferring areas identified through scoping and other information-gathering steps as being potentially environmentally sensitive. The draft EIS is filed with EPA and distributed to Federal Agencies and State and local governments. It is available free of charge to the public from the appropriate OCS regional office.

Public hearings are generally held at a location convenient to residents in the potentially affected area. In addition, comments received within the prescribed

60-day comment period, which begins with the date the draft EIS is published, are considered in preparing the final EIS. The final EIS, like the draft EIS, is filed with EPA, and its availability is announced in the *Federal Register*. The final EIS is then distributed in the same manner as the draft EIS.

A proposed notice of sale is prepared on the basis of analysis in the final EIS and other decision documents. The proposed notice contains the list of blocks proposed to be offered (or, in the Gulf of Mexico, the list of blocks excluded from the sale), bidding systems to be used for acquiring rights to a lease, lease stipulations, and other measures designed to mitigate effects projected as a result of the sale. A notice of availability of the proposed notice is published in the *Federal Register* at least 90 days before the scheduled sale date.

A copy of the proposed notice is sent to the Governors of the affected coastal States for their comments on the size, timing, or location of the sale. The Governors' comments are considered by the Secretary of the Interior before making final decisions concerning the configuration, timing, and the terms and conditions of the sale.

If, after consideration of the Governor's comments and any pertinent new information, the Secretary decides to proceed, the final notice of sale is issued. The final notice specifies the date, location, and the terms and conditions of the sale, and is published in the *Federal Register*.

The sale is held at least 30 days after the final notice is published. Sealed bids are submitted by qualified bidders and can be accepted by the MMS up to the day before the sale. Included with the sealed bid is one-fifth of the bonus bid amount. Any bids submitted after that deadline are not accepted. There is a public opening and reading of the sealed bids, usually in the city in which the OCS regional office is located. Lease sales are open to the public and the press.

The decision to accept or reject bids is made by the MMS Regional Director. The MMS evaluates the bids to assure the receipt of fair market value. The results of the sale are also reviewed by the Attorney General and the Federal Trade Commission to assure compliance with antitrust laws. Once these reviews are completed, the Regional Director notifies the high bidders of the acceptance or rejection of their bids. Leases are issued to successful bidders after receipt of the balance of the bonus bid and the first year's rental.

FIGURE 4. *Audience at lease sale*

Chapter 5. Operations Framework

A. Coordination with Other Agencies

Oil and gas operations on the OCS are conducted within a framework of laws and regulations that is as complex as the marine environment itself. As mentioned earlier, there are over 30 Federal laws requiring Federal Departments and Agencies, other than DOI, to regulate some phase of operations on the OCS. The DOI acts through MMS in implementing the Federal OCS mineral leasing management program and the permitting of lease operations. The MMS acts as a public clearinghouse disseminating information and documents, such as plans of exploration and environmental reports, to involved regulatory authorities and other interested parties. Much of this coordination takes place through the review and approval procedures established pursuant to 30 CFR 250.34. (See Chapter 6, Plans, Permits, and Operations.)

Coordination is implemented in various ways and takes place at the following levels:

Between MMS and other Bureaus within DOI,
Between DOI and other Federal Agencies, or
Between DOI and State and local agencies.

For each of these levels, examples will be given showing the various ways of involving other bureaus and agencies.

1. *MMS and Other DOI Bureaus*. Coordination among the several Bureaus within DOI is based on DOI and MMS policy to cooperate when planning and operating similar functions. These Bureaus include MMS, USGS, BLM, the U.S. Fish and Wildlife Service (FWS), and the National Park Service (NPS). They coordinate with each other through established committees that provide forums for the exchange of ideas and data. Specific responsibilities are formally described in the Departmental Manual, 655 DM 1, Inter-Bureau Coordination. This chapter sets timeframes, delineates responsibilities and authorities, and establishes the means for resolving any disagreements that may occur.

2. *DOI and Other Federal Agencies*. In general, DOI and other Agencies coordinate through Memorandums of Understanding (MOU). These documents are formalized agreements as to how responsibilities will be fulfilled and authorities exercised. These agreements are reviewed periodically to ensure that the original purposes and objectives are still being met by each of the participants. The following examples are some of the more important agreements.

a. Oil Spill Containment and Cleanup. In 1971, DOT and DOI signed an MOU defining the role each would play in the event of an oil spill. This MOU is implemented through the USCG and the MMS. (The MMS contains the responsible organizational components of the USGS which was the original signatory.) The MOU states that MMS will act to abate the source of pollution such as a broken wellhead. The USCG will act to contain and recover the oil spill. These responsibilities are appropriate to the type of technical expertise maintained on the staff of the respective Agencies.

b. Regulation of Operations. An MOU was signed by the USCG and MMS in December 1980 which divided the OCS responsibilities of these two Agencies according to their legal authority and technical expertise. The USCG is responsible for regulating ship-type operations on drilling vessels, while the MMS is responsible for regulating oil and gas drilling and producing operations.

c. Drilling and Other Discharges.
The third example is that of an MOU completed with EPA in early 1984. This MOU provides for the two Agencies to coordinate studies and related regulatory responsibilities. The goal is to enable EPA to issue discharge permits at the time DOI publishes a final notice offering a given area for sale. The EPA participates in DOI's environmental studies program and EIS's. This gives EPA a mechanism for using environmental information from DOI programs in issuing these permits. The MOU also sets up regionally negotiated memorandums of agreement between EPA and MMS for monitoring and inspecting oil and gas operations to ensure compliance with the terms of the permits.

3. *DOI and State Agencies*

a. Consultation Under the OCS Land Act.
Coordination with State governments begins with the development of the DOI 5-year program and leasing schedule and continues with the development of the individual lease sales. Communication is maintained throughout the exploration, development, and production phases of operations on the OCS.

As detailed in other sections, MMS sends copies of all exploration plans and development and production plans to the Governor's offices and CZM offices of affected States. They are sent to the Governor's offices for review and comment and to the CZM offices of affected States for Federal CZM consistency review and concurrence.

b. OCS Oil and Gas Information Program.
Coordination with the States is supported directly by the OCS information program (OCSIP) which was developed pursuant to Section 26 of the OCS Lands Act, as amended. This section requires MMS to provide regional summary reports of information and data to affected States. The summary reports are designed to assist State and local governments in planning for onshore impacts of potential offshore oil and gas development and production. Section 26 also requires MMS to provide affected States with an index that lists all relevant, actual, or proposed programs, plans, reports, EIS's, and lease sale information used by the Federal Government in its decisionmaking process. None of these documents contain proprietary information.

B. OCS Advisory Board

The OCS Advisory Board, established by the Secretary of the Interior in 1975, is involved at every stage of the Federal OCS mineral lease operations management program and represents the entire range of interests, authorities, and responsibilities that exist on the OCS. The Board's function is to advise the Secretary of the Interior and other officers in DOI on the performance of discretionary functions of the OCS Lands Act, as amended. The following eight committees comprise the national OCS Advisory Board: the policy committee, the scientific committee, and six regional technical working groups (RTWG's) (Figure 5). The policy committee is involved throughout the OCS program, but much of its activity to date has been at the prelease stage. The scientific committee is involved with environmental studies, and most of these studies are initiated before operations begin. For these reasons, the policy and scientific committees are discussed in detail in the leasing booklet.

Each RTWG advises MMS on technical matters of regional concern regarding prelease and postlease activities and on environmental study requirements. Thus, the RTWG is involved in every aspect of the leasing program under MMS jurisdiction. Each RTWG is composed of representatives of the affected States, USCG, EPA, National Oceanic and Atmospheric Administration (NOAA), the Department of Defense, and public and private sector members appointed by the Secretary to effect a balance in terms of points of view, expertise, and functions of the committee. Each RTWG is cochaired by an MMS Regional Director and a State representative. Federal members of the RTWG are exofficio and do not vote.

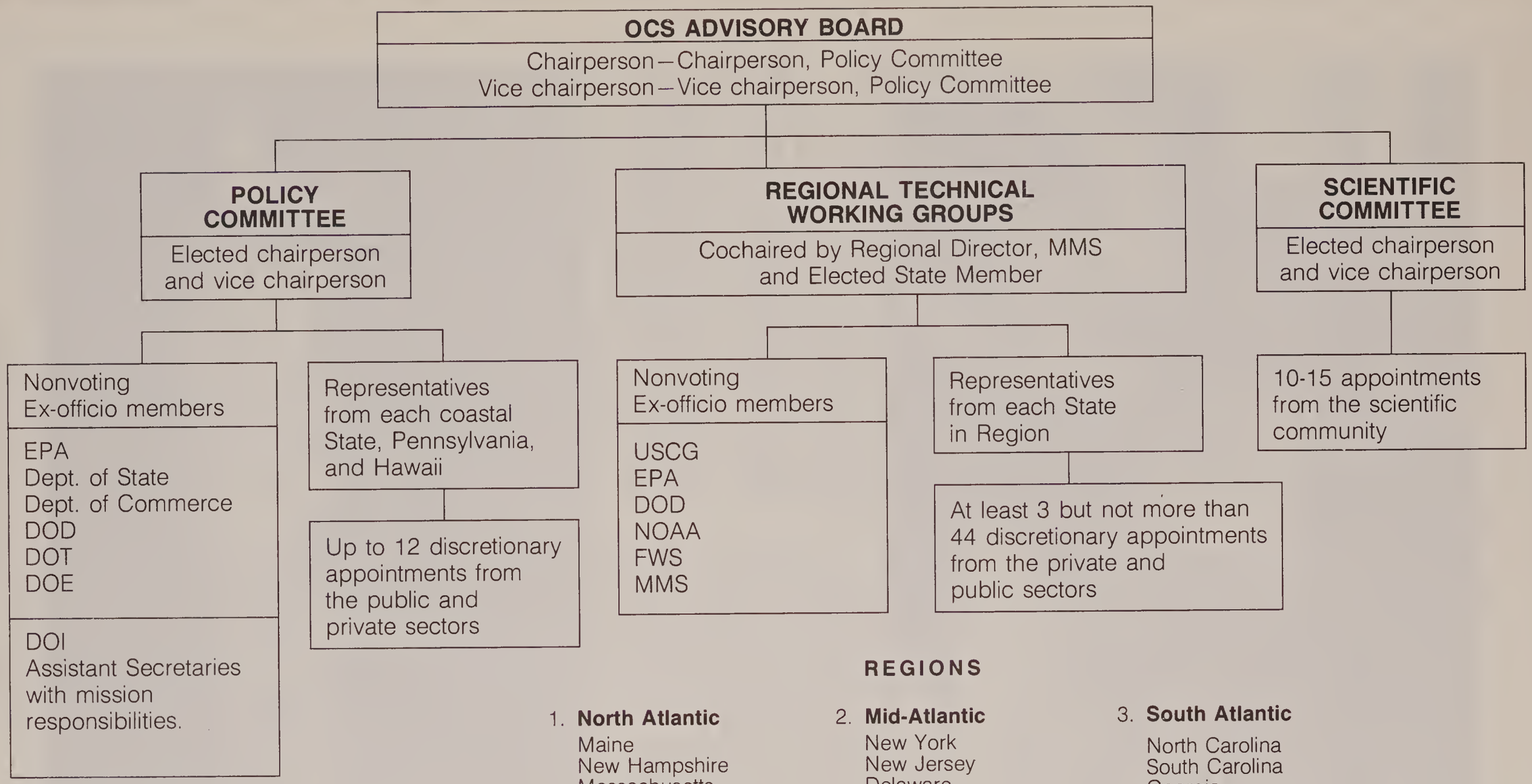


FIGURE 5. *OCS Advisory Board*

REGIONS

1. **North Atlantic**
   Maine
   New Hampshire
   Massachusetts
   Rhode Island
   Connecticut
   New York
   New Jersey
2. **Mid-Atlantic**
   New York
   New Jersey
   Delaware
   Pennsylvania
   Maryland
   Virginia
   North Carolina
3. **South Atlantic**
   North Carolina
   South Carolina
   Georgia
   Florida
4. **Gulf of Mexico**
   Florida
   Alabama
   Mississippi
   Louisiana
   Texas
5. **Pacific**
   California
   Oregon
   Washington
6. **Alaska**
   Alaska

Chapter 6. Plans, Permits, and Operations

On the basis of the authorities described in the previous chapters, MMS performs an oversight function of activities on the OCS. Managing oil and gas operations includes approving plans and permits and overseeing exploration and development activities. These subjects are described in the following sections generally in the order in which they occur.

A. Preliminary Activities

Exploration drilling may not be conducted on any lease until MMS approves the lessee's various applications and plans. However, certain geological and geophysical operations, usually referred to as "preliminary activities" are conducted which enable the lessee to develop a comprehensive exploration plan. Preliminary activities include surveys of the area where drilling will take place.

Site-specific shallow hazards surveys are required to indicate the presence of geologic and manmade hazards or hazardous conditions as deep as 1,000 feet beneath the seafloor. Hazardous conditions, both geologic and manmade, include shallow faults and gas, mass-movement features, steep slopes, munitions, pipelines, etc. A shallow hazards survey focuses on the proposed area for exploratory drilling activity and involves the use of high-resolution geophysical instrumentation such as a depth sounder, side-scan sonar, and subbottom reflection profiler. A magnetometer may be used to detect pipelines, munitions, and other ferromagnetic objects. More detailed information may be acquired through tighter grid spacing and the use of different equipment.

The survey analysis submitted to MMS either demonstrates that hazardous conditions are not present at any proposed

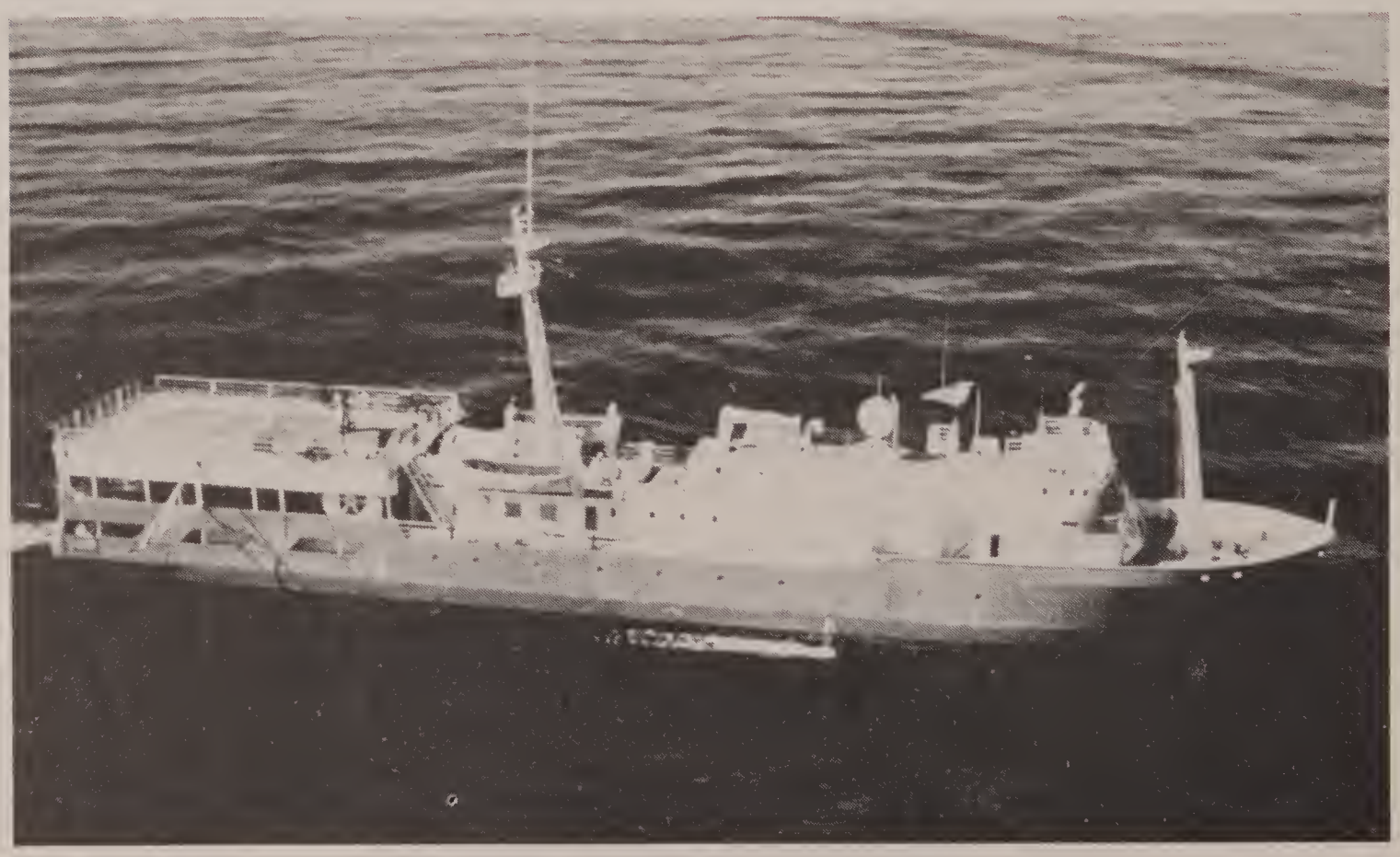


FIGURE 6. *Conducting seismic operations*

FIGURE 7. *Technicians studying information aboard a seismic vessel*

drilling site or, if present, that drilling operations can be safely conducted to avoid or minimize risk of damage to the human, marine, or coastal environments. Shallow hazards survey results may lead to platform and well relocations or, in extreme situations, to cancellation of a lease.

Preliminary activities also include cultural resource and biological surveys as well as analyses by divers or remote-operated vehicles.

B. Exploration Plan

1. *Submission of an Exploration Plan.* Once preliminary activities have been conducted, the lessee may submit an exploration plan to MMS for approval. Other than for the preliminary geophysical, geological, cultural, and biological surveys, the lessee cannot begin exploratory drilling until an exploration plan has been approved for the lease and an APD has been submitted and approved. The exploration plan provides a concise description of the proposed offshore operations, and lessees are required to submit revisions for any significant changes. To be approved, an exploration plan must be consistent with the provisions of the OCS Lands Act, as amended, applicable rules and regulations, and provisions of the lease. A plan may apply to one or more leases or may be submitted by a group of lessees acting under an approved unitization, pooling, or drilling agreement.

The exploration plan is accompanied by an oil spill contingency plan and an environmental report (ER) which are subject to the same review process as the exploration plan. The oil spill contingency plan describes the lessee's proposed response to an oil spill (see section D). The ER assesses direct and indirect effects on the environment by the proposed oil and gas activities and provides the State(s) with the necessary data and information to determine consistency under the CZM Act. Additionally, the lessee includes a copy of the certificate of coastal zone consistency for each affected State pursuant to the Department of Commerce regulations. The certificate states that the proposed exploration activity complies with and will be conducted in a manner consistent with a State's approved CZM program.

2. *Reviewing and Analyzing the Exploration Plan.* Upon receipt, a regional office reviews an exploration plan and accompanying documents for completeness and conformity with rules, regulations, regional requirements, and MMS policy. If not complete, they are returned to the lessee for the addition of missing information or data. Once an exploration plan is deemed to be complete, MMS has 30 days in which to approve or disapprove the plan. Copies of the exploration plan with the accompanying ER, oil spill contingency plan, and coastal zone consistency certification are forwarded for review to other Federal Agencies, including the FWS, National Marine Fisheries Service (NMFS), EPA, COE, USCG, and the Office of Ocean and Coastal Resource Management (formerly, Office of Coastal Zone Management). Copies are also sent to the State Governor(s), other interested State agencies, and to the office responsible for the CZM consistency review of each affected State that has an approved CZM program. (Activities described in an approved exploration plan cannot be permitted until State coastal zone consistency concurrence is received.) The MMS regional office also makes copies available to the public (except for those portions of the exploration plan determined to be exempt from disclosure under the Freedom of Information Act).

The MMS personnel conduct a technical review and prepare comments on the exploration plan. The proposed type and sequence of exploration activities, along with the tentative timetable, are analyzed for reasonableness and possible conflict with other activities in the vicinity of the lease. Descriptions of the geophysical equipment, the drilling vessel, and pollution-control devices are reviewed for compliance with rules, regulations, provisions of the lease, etc. The oil spill contingency plan is evaluated (by MMS and USCG under a cooperative agreement) to ensure that necessary equipment, material, and personnel are appropriate and available. Exploratory well locations, structure maps, and marker formation depths on schematic cross sections are also analyzed.

As required by NEPA, the MMS regional environmental staff analyzes all activities proposed in the exploration plan. In completing this analysis, the staff utilizes information contained in the ER such as descriptions of the following:

- Onshore support and storage facilities;
- Number of people estimated to be employed;
- Quantity and composition of solid, liquid, and gaseous wastes (air pollutant emissions);
- Boat and aircraft traffic patterns;
- Major supplies, services, energy, and water necessary for implementation of the exploration plan; and
- Environmentally sensitive areas including site-specific geology, historic meteorological patterns, physical oceanography, onsite flora and fauna, refuges, preserves, sanctuaries, rookeries, calving grounds, onsite uses of the area (e.g., recreation), archaeological and cultural resources, and environmental monitoring systems.

In addition, the environmental staff considers the technical comments from MMS engineers, geologists, and geophysicists as well as comments from Federal and State agencies and other reviewers. In many instances, this environmental review is documented by MMS in an environmental assessment (EA) as provided by the regulations implementing NEPA. An EA is prepared to help MMS determine if significant environmental impacts would result from implementing the plan. If no significant environmental impacts are anticipated, the MMS then prepares a finding of no significant impact (FONSI). (The notice of availability of EA's and associated FONSI's is published periodically in the *Federal Register.)* Historically, EA's prepared for exploration plans in the western Gulf of Mexico have indicated that no significant environmental impacts would occur. Based on this experience, MMS has determined that it is normally unnecessary to prepare either an EIS or an EA for exploration plans in the western Gulf of Mexico. These plans have been identified as categorical exclusions from NEPA compliance documentation requirements. However, each plan is reviewed to verify that the impacts associated with it need no formal documentation. This review is also conducted to identify any mitigation measures

that might be implemented to minimize those environmental impacts that are associated with the plan.

Concurrent with MMS review and environmental analysis of a plan, a State with an approved CZM program, whose land and water use will be affected by the proposed activities, reviews the plan, ER, and applicant's consistency certification. If the affected State determines that the project is consistent with its approved CZM program, the State will concur with the consistency certification. States without approved CZM programs are also given an opportunity to review the exploration plan, and MMS considers their comments.

3. *Approval or Disapproval of an Exploration Plan.* By the expiration of the allotted 30-day period, the MMS regional office notifies the lessee of the approval or disapproval of the exploration plan. The MMS disapproves the plan if the proposed activity would probably cause serious harm or damage to life (including fish and other aquatic life), property, any mineral (in areas leased or not leased), the national security or defense, or to the marine, coastal, or human environment. Activities described in the plan cannot be permitted by MMS until the State coastal zone consistency concurrence is received from all affected States with CZM approved programs. If such a State rules that the plan is inconsistent with its CZM program, MMS will not approve the permits detailed in the plan (pursuant to the CZM Act). The applicant may appeal to the Secretary of Commerce.

The review process and the timing involved are summarized in the flow diagram (Figure 8).

C. Development and Production Plan

1. *Submission of the Development and Production Plan.* Before development and production activities can begin, the lessee must obtain approval for its development and production plan from an MMS regional office. A plan may apply to one or more leases or may be submitted by a group of lessees acting under an approved unitization, pooling, or drilling agreement. The plan includes a description of the specific work to be performed; drilling vessels, platforms, pipelines, or facilities to be used; location and depths of proposed wells; geological and geophysical data; environmental safeguards and safety standards to be met; and a time schedule of development and production activities.

Regional Directors may specify additional requirements based on the weather or other local conditions. For example, plans may include provisions for dealing with emergency situations such as the drilling of a relief well in the event of a blowout, the loss or disablement of a drilling unit or a drilling rig, and the loss of, or damage to, support craft. In areas subject to subfreezing weather, the lessee must furnish evidence that equipment and materials are suitable for use under such conditions.

Like the exploration plan, the development and production plan is accompanied by an oil spill contingency plan and an ER. The oil spill contingency plan describes the lessee's proposed response to an oil spill (see section D). The ER describes the extent and timing of proposed offshore and land-based operations; requirements for land, labor, material, and energy; means proposed for transportation of oil and gas to shore; disposal of solid and liquid wastes; cultural and historical concerns; oceanographic, meteorological, and geological conditions; and the significance of any impacts on aquatic biota due to the use of a proposed site for development and production facilities. In addition, the lessee must furnish a copy of the certificates submitted to the affected States which assert that the proposed development and production activities comply with and will be conducted in a manner consistent with the State's approved CZM programs.

Further, site-specific analysis and survey work will be required of the lessee if the shallow hazards survey completed during the exploration phase does not cover the proposed site of development and production activity.

EXPLORATION PLAN REVIEW

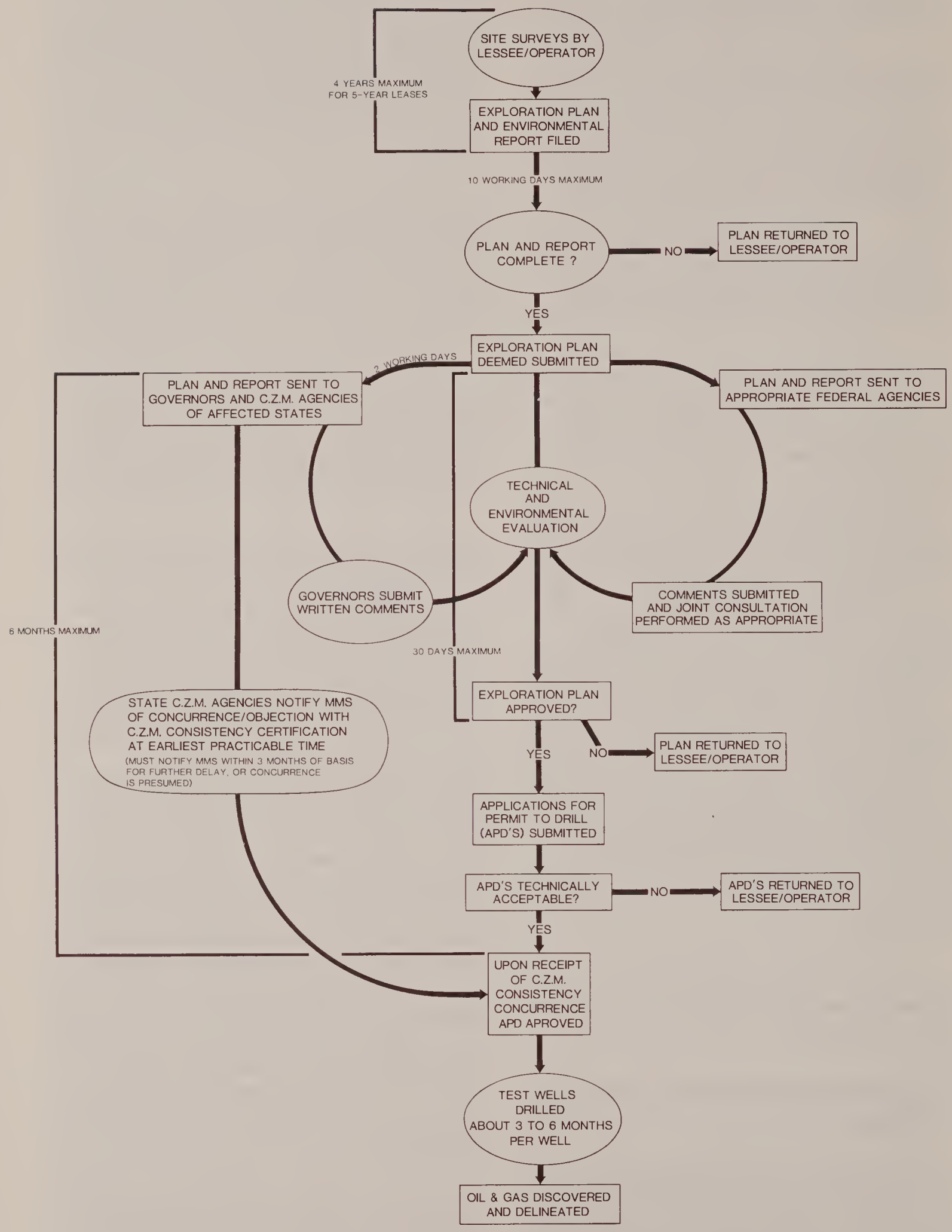


FIGURE 8. *Exploration Plan Review*

2. *Reviewing and Analyzing the Development and Production Plan.* After an initial review by an MMS regional office, the plan is either (1) returned to the lessee for additional information, or (2) deemed to be complete. If complete, copies are distributed, and the MMS technical review process begins.

Copies of the plan and the accompanying oil spill contingency plan and the ER are distributed to other Federal Agencies and the Governors of affected States; they are also made available for public review and comment as announced in the *Federal Register.* (Certain information contained in the plan may be deleted pursuant to the Freedom of Information Act as explained in the section on proprietary data in chapter 7.) The oil spill contingency plan and the ER are similar to the ones submitted with an exploration plan. The oil spill contingency plan, however, may include information concerning additional equipment and personnel because the possibility of an oil spill is greater during the development and production phases of an operation.

The technical review is similar to that for an exploration plan except that the review must be completed within 120 days after the plan is deemed to be complete. However, if it is determined that an EIS must or should be prepared, the 120-day restriction does not apply.

The review addresses the environmental impacts of the proposal including seismic risks, areas of high ecological sensitivity, hazardous bottom conditions, and the use of new and unusual technology. In many instances, this review is documented by MMS in an EA and/or an EIS as provided by the regulations implementing the NEPA. An EA is prepared to help MMS determine if significant environmental impacts would result from implementing the plan. If no significant environmental impacts are anticipated, MMS then prepares a FONSI. (The notice of availability of EA's and associated FONSI's is published periodically in the *Federal Register.)*

An EIS is prepared when MMS determines that approval of a development and production plan constitutes a major Federal action significantly affecting the quality of the human environment. (The OCS Lands Act requires that, for any area or region other than the Gulf of Mexico, the Secretary must at least once declare that the approval of a development and production plan be considered a major Federal action.)

When an EIS is deemed necessary, particular consideration is given to addressing the significant adverse impacts upon the marine, coastal, or human environments resulting from the construction of new onshore and offshore facilities. Cumulative and previously unforeseen impacts are also considered.

Impact statements for development and production plans for offshore California are sometimes prepared jointly with the State. These joint analyses are called "environmental impact statements/environmental impact reports" and serve to meet both Federal and State of California environmental analysis requirements. Requirements of the California Environmental Quality Act are similar to the NEPA requirements and thus permit these joint analyses.

In most cases, it is not necessary to prepare an EA or an EIS for development and production plans in the western Gulf of Mexico for the same reasons as explained in the chapter on exploration plans. Coastal zone consistency is also determined in a manner similar to that for an exploration plan.

3. *Approval or Disapproval of the Development and Production Plan.* Before expiration of the prescribed 120-day period, the MMS regional office notifies the lessee of the approval, disapproval, or required modifications for the development and production plan. The MMS disapproves the plan if all affected States have not concurred with the lessee's coastal zone consistency certifications. In the event of an inconsistency ruling, the lessee may modify the plan and resubmit it to MMS for reconsideration, or the lessee may appeal to the Secretary of Commerce. A plan is also disapproved if it is determined

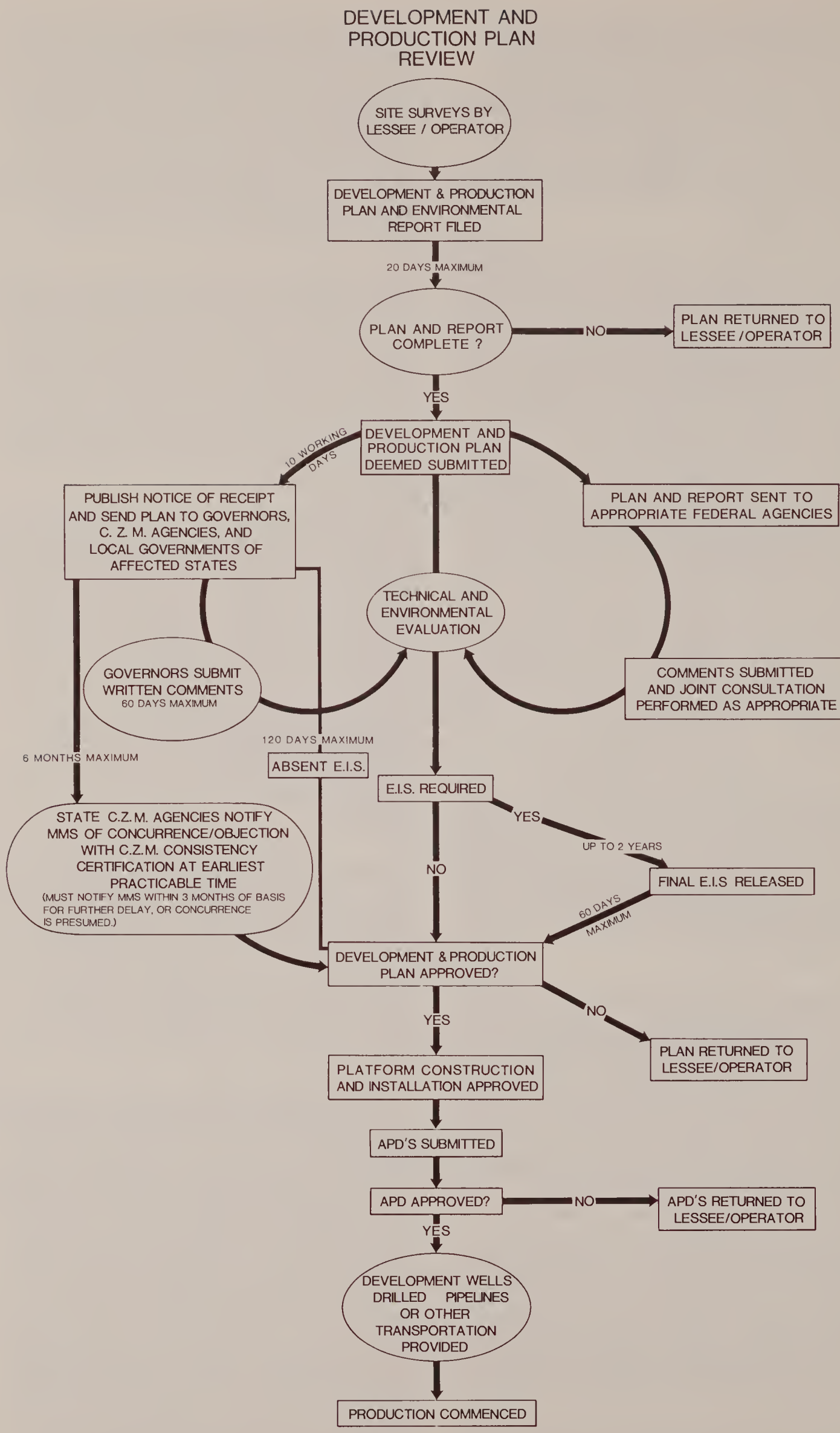


FIGURE 9. *Development and Production Plan Review*

that (1) the lessee has failed to demonstrate compliance with the requirements of applicable Federal laws and regulations, (2) activities proposed threaten national security or national defense, or (3) it is determined that the proposed activity would probably cause serious harm or damage to life (including fish and other aquatic life), property, any mineral (in areas leased or unleased), or to the marine, coastal, or human environment. Once approved, minor revisions may be made either at the initiative of the lessee or MMS. However, significant or major revisions to the plan must be resubmitted for review and approval in the same manner as a new plan.

The review process and the timing are summarized in the flow diagram (Figure 9).

D. Oil Spill Contingency Plan and Contingency Funds

An oil spill contingency plan is submitted for MMS approval as part of the exploration plan and the development and production plan. The plan identifies response equipment, responsible Agencies and personnel, and sets forth in detail the procedures to be employed in responding to an oil spill. The plan provides measures and procedures to cope with the pollution which results from offshore oil and gas operations.

1. *Responsibilities for Oil Spill Control.* The primary Federal Agencies or Bureaus involved in offshore oil spill control and cleanup activities are EPA, DOT (through USCG) and DOI (through MMS). A 1971 MOU between DOT and DOI clarified respective responsibilities for pollution control. The MOU recognizes that the USCG has the expertise and capability to coordinate and direct measures to contain and remove pollutants. The MMS, on the other hand, has the expertise and capability to coordinate and direct measures to abate the source of pollution when the source is an oil or gas well.

A second MOU between MMS and USCG (which listed authorities and responsibilities in detail) was signed in 1980. Concerning oil spill contingency plans, the USCG is responsible for providing recommendations to MMS on the basis of a technical review of the oil spill contingency plan. The MMS has authority for the approval of the oil spill contingency plan (which is part of an exploration or development and production plan).

Oil spill cleanup equipment is maintained in the various OCS areas by individual firms that conduct offshore operations, by cooperative organizations representing a number of firms engaged in such operations, and by the USCG strike teams. Still other equipment may be maintained by State or local authorities as well as private groups.

In the event of an oil spill during offshore oil and gas operations, the lessee is expected to abate the pollution source and simultaneously initiate containment and cleanup action with onsite equipment or additional equipment staged at appropriate onshore locations. In the event such equipment cannot handle the containment or cleanup, the lessee is expected to use the equipment and personnel of one or more of the cooperative organizations established for this purpose. The control and total removal of the pollution is the responsibility of the lessee. If the lessee fails to control and remove the pollution, the Federal Government, in conjunction with the State and local authorities, will act to control and clean up a spill at the expense of the lessee.

For offshore oil spills, the USCG designates an onscene coordinator who is responsible for directing the Federal response to the oil spill. The coordinator provides reports to, and receives advice from, the regional response team which is composed of representatives from participating Agencies, States, and local governments. If necessary, the coordinator can call on a USCG strike team for assistance in the containment and cleanup effort.

2. *Contingency Funds.* One of the purposes of the OCS Lands Act Amendments of 1978 was to provide for contingency funds for pollution cleanup and fishing damages where the responsible party is

FIGURE 10. *Practice drill for skimming oil with an OCS skimming system*

FIGURE 11. *View from skimmer during an oilspill drill*

not known. Both the DOT and Treasury Department are responsible for the Offshore Oil Pollution Compensation Fund. The level of funding is maintained at $100 to $200 million by levying a charge up to 3 cents a barrel on the lessee for oil production. The fund is available for oil spill removal costs and for the processing and settlement of claims for damages resulting from oil spills. To date, no claim has been made for oil spill cleanup or damages.

The Amendments also provide for the Department of Commerce (DOC) and the Treasury Department to maintain a Fishermen's Contingency Fund for reimbursing fishermen for damage or loss of fishing gear and loss of profits due to offshore oil and gas operations where the responsible party is not known. The fund is maintained by assessing holders of leases, permits, rights-of-way, and easements for amounts up to $5,000 annually. The limit of the fund

is set at $2 million. Claims are handled by the NMFS of the DOC. Through 1985, a total of $1,513,300 had been paid out in claims.

E. Application for Permit to Drill

Before any exploratory or development drilling begins on an offshore lease, the lessee must submit an APD to MMS. A new APD must be filed and approved each time a well is drilled, deepened, or plugged back. The APD requires that the lessee submit extensive detail about a drilling program, including the blowout-prevention system and the casing, cementing, and drilling-mud programs. This information enables the MMS engineers and technicians to evaluate a drilling program's operational safety and pollution-prevention measures.

The MMS staff reviews APD's in detail. Structure maps and well cross sections are analyzed for accuracy in interpretation and mapping. Well logs are examined for pressure abnormalities that may be important to the well-control program. Casing, cementing, and mud programs are reviewed to ensure that they are sufficient to maintain well control and to protect the environment. Formation pressures are checked against mud weights, casing setting depths against formation fracture gradients, and blowout preventers against maximum possible surface pressures. Other features checked are well-control equipment and procedures, operational safety and pollution-prevention systems, and the rig inventory for mud and mud additives (which are essential for counterbalancing subsurface formation pressures). Additionally, under arctic conditions where permafrost or occasional hydrate zones may be encountered, the casing, cementing, and mud programs are reviewed even further for proper design.

Conditions of approval (as defined in chapter 3, paragraph C) are often attached to the APD when the review process is completed. These conditions amplify or explain items in the regulations or specify procedures that are unique to the well site. The information provided in an APD forms the basis for the subsequent inspection of operations to ensure conformance with the permit.

Other Federal permits required before drilling begins include permits for aids to navigation and certification of mobile offshore drilling units by the USCG, permits for platforms in navigable waters by COE, and permits for discharges by EPA.

F. Platform Approval Procedures

The MMS reviews the structural integrity and safety of proposed fixed and bottom-founded platforms and major structural modifications to existing fixed and bottom-founded platforms in one of two programs. One program, the platform approval program, takes into account the nearly 30 years of operating experience and the safety record of the more than 3,000 platforms existing on the OCS. The procedures for this program are currently followed only in the Gulf of Mexico. The second program, the platform verification program, addresses platforms that are of a new or unique design or that are to be installed in frontier areas, in deep water (i.e., water deeper than 400 feet), or in areas significantly and adversely affected by local environmental conditions or foundation problems. The procedures in this program are followed for all platforms outside the Gulf of Mexico and for all platforms located in the Gulf of Mexico in waters deeper than 400 feet.

Under the platform approval program, MMS engineers review applications for installation of conventional platforms for structural adequacy. The application submitted by the lessee includes detailed platform designs which must be certified by a registered professional structural engineer. The Regional Director then bases the MMS approval or disapproval of the platform installation on this information.

The platform verification program uses certified verification agents (CVA's) to conduct reviews of the design for structural integrity and to oversee fabrication and installation of the structures for conformity

with recommended procedures. The CVA's are independent, third-party technical organizations which the MMS approves. The CVA's, which lessees select (from the list of those approved by MMS), provide the lessee and MMS with detailed reports of the findings and recommendations upon completion of each phase of a project. Onsite structural inspections of platforms are conducted by MMS personnel during all three phases of the verification process to review CVA performance.

G. Oil and Gas Exploration, Development, and Production

1. *Exploration.* The initial phase of offshore oil and gas operations is exploration. Exploratory drilling occurs after a lease has been awarded and continues until economically recoverable resources are discovered or until a sufficient number of unsuccessful wells have been drilled to discourage further exploration. In the event oil or gas is discovered, a number of delineation wells are usually drilled to determine the extent of the reservoir.

The various types of exploratory drilling units used on the OCS include jack-ups, submersibles, semisubmersibles, and drillships. The operator chooses the type of drilling vessel according to availability, water depth, bottom condition, and other factors.

The jack-up has tubular or truss legs that support the hull and deck. It is towed or propelled to an offshore location with its legs up. When positioned over the drilling site, the legs are lowered to rest on the seafloor. When the legs are firmly

FIGURE 12. *Jack-up drilling in Norton Sound*

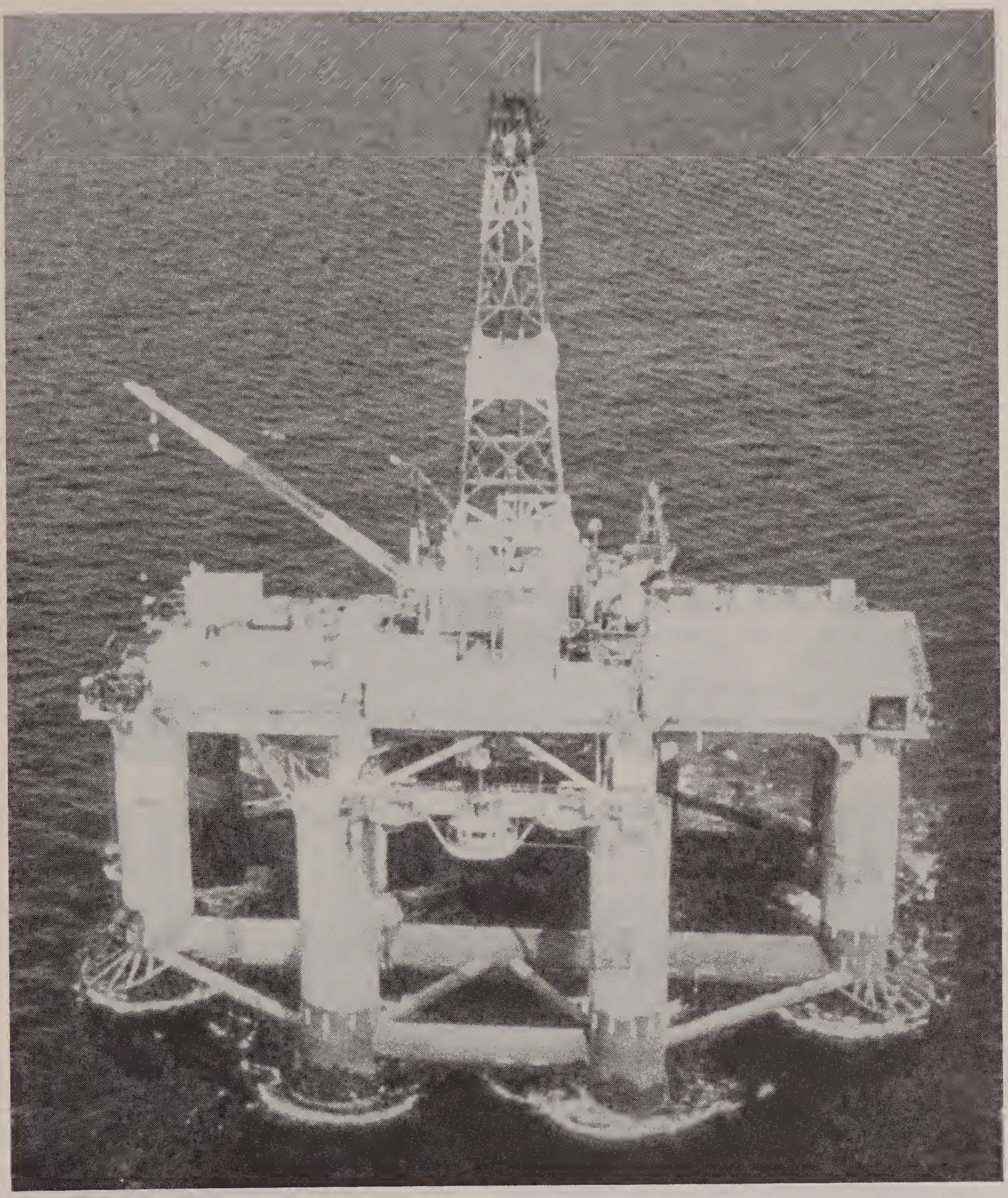


FIGURE 13. *Semisubmersible, Ocean Victory, enroute to drilling site*

positioned on the bottom, the hull is jacked up to the desired height, and the deck level is adjusted. The jack-up is limited to water depths of 400 feet or less.

The submersible drilling structure includes several hull compartments which are flooded to cause the unit to submerge and rest on the seafloor. Because of this feature, submersibles are used only in shallow waters.

The semisubmersible is a floating drilling structure with hulls that are buoyant. The structure supports living quarters, storage space, etc., which are located on one or more upper decks. Semisubmersibles are either propelled or towed to a drilling site where they are either anchored or dynamically positioned over the site.

The drillship is constructed in a normal ship configuration and is designed to

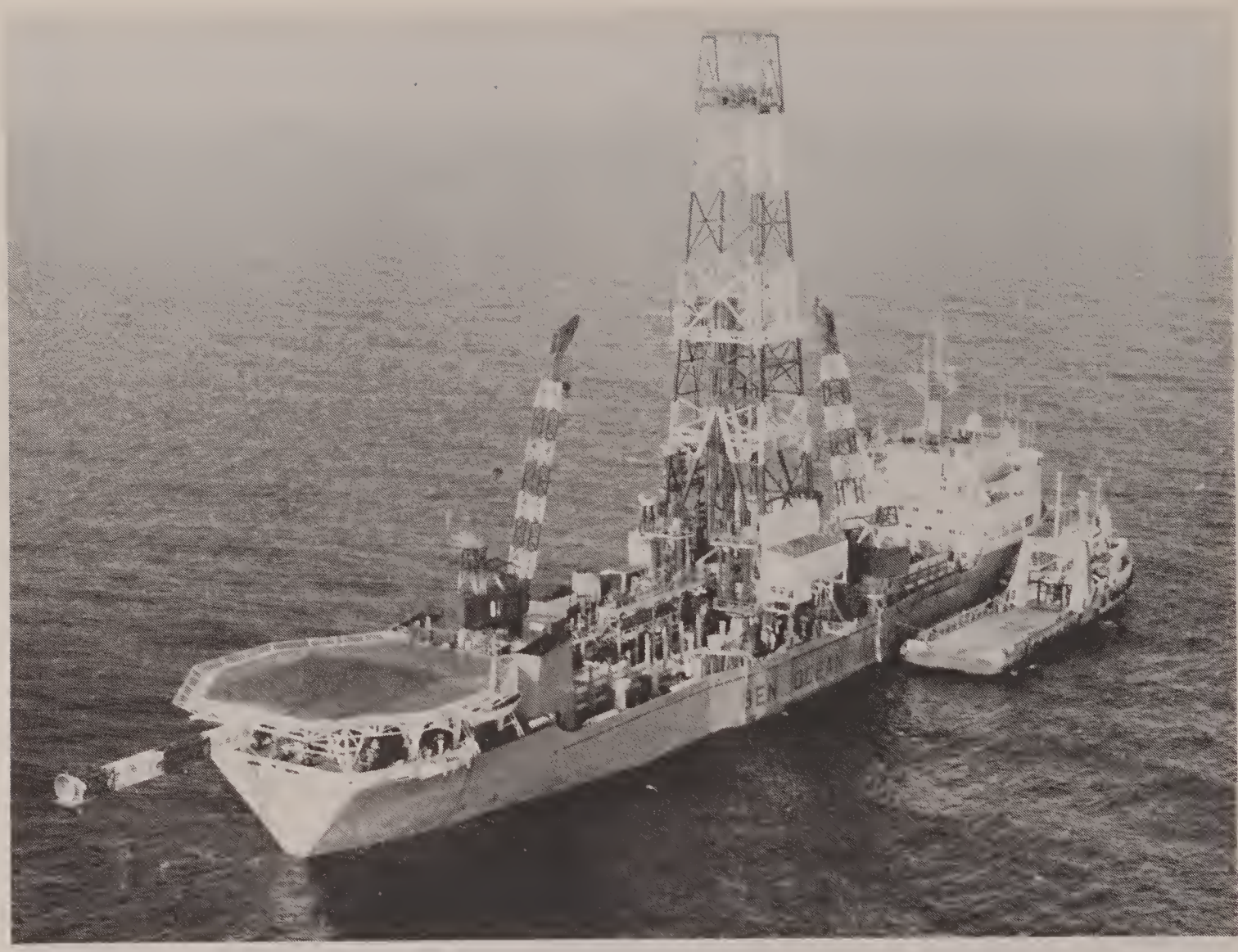


FIGURE 14. *Drillship, Ben Ocean Lancer*

FIGURE 15. *Drillship equipment riser and riser slip joint and tension cable in the "moon" pool*

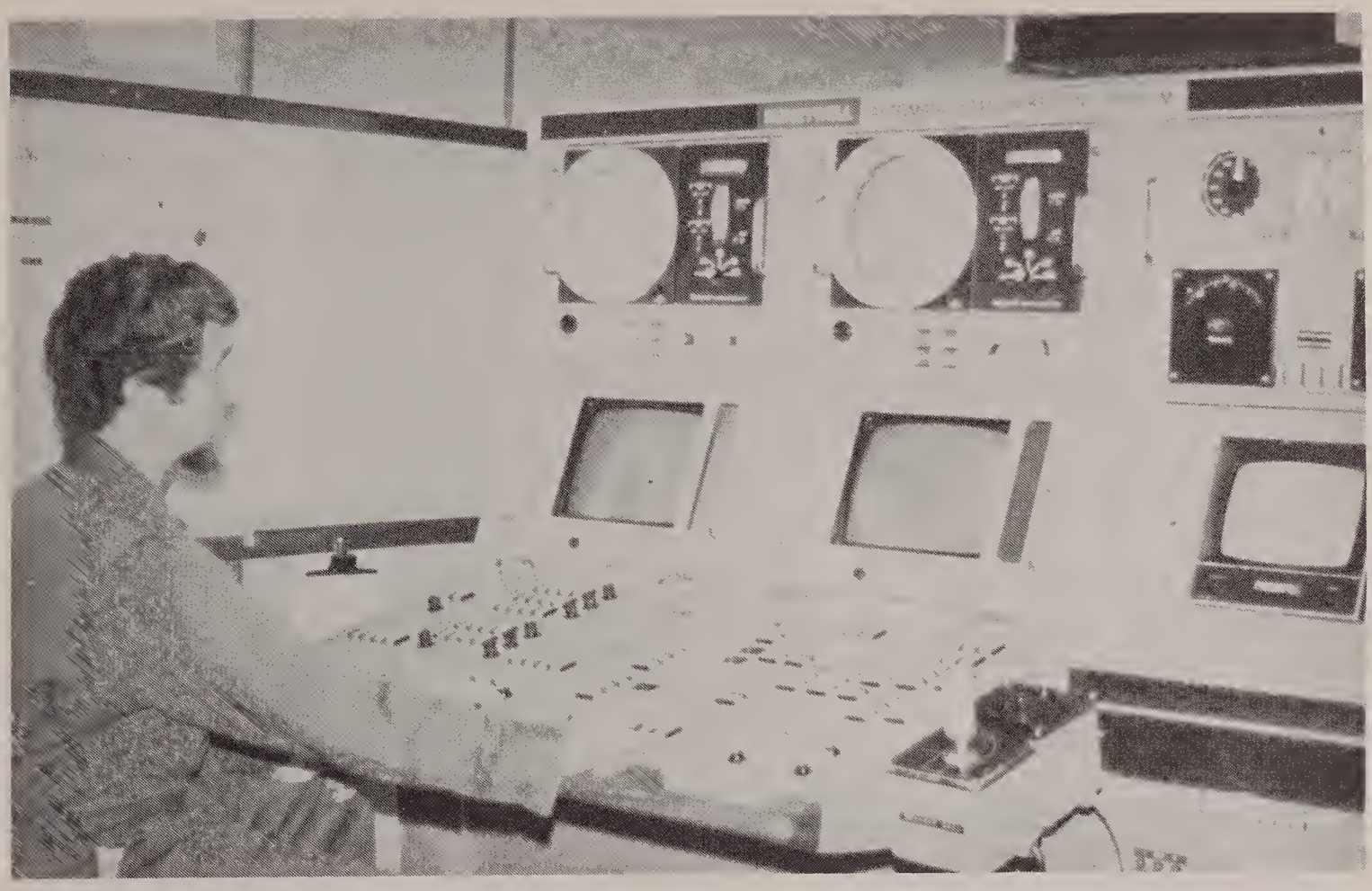


FIGURE 16. *Drilling equipment operator manning thrust controls for dynamic positioning on the Ben Ocean Lancer*

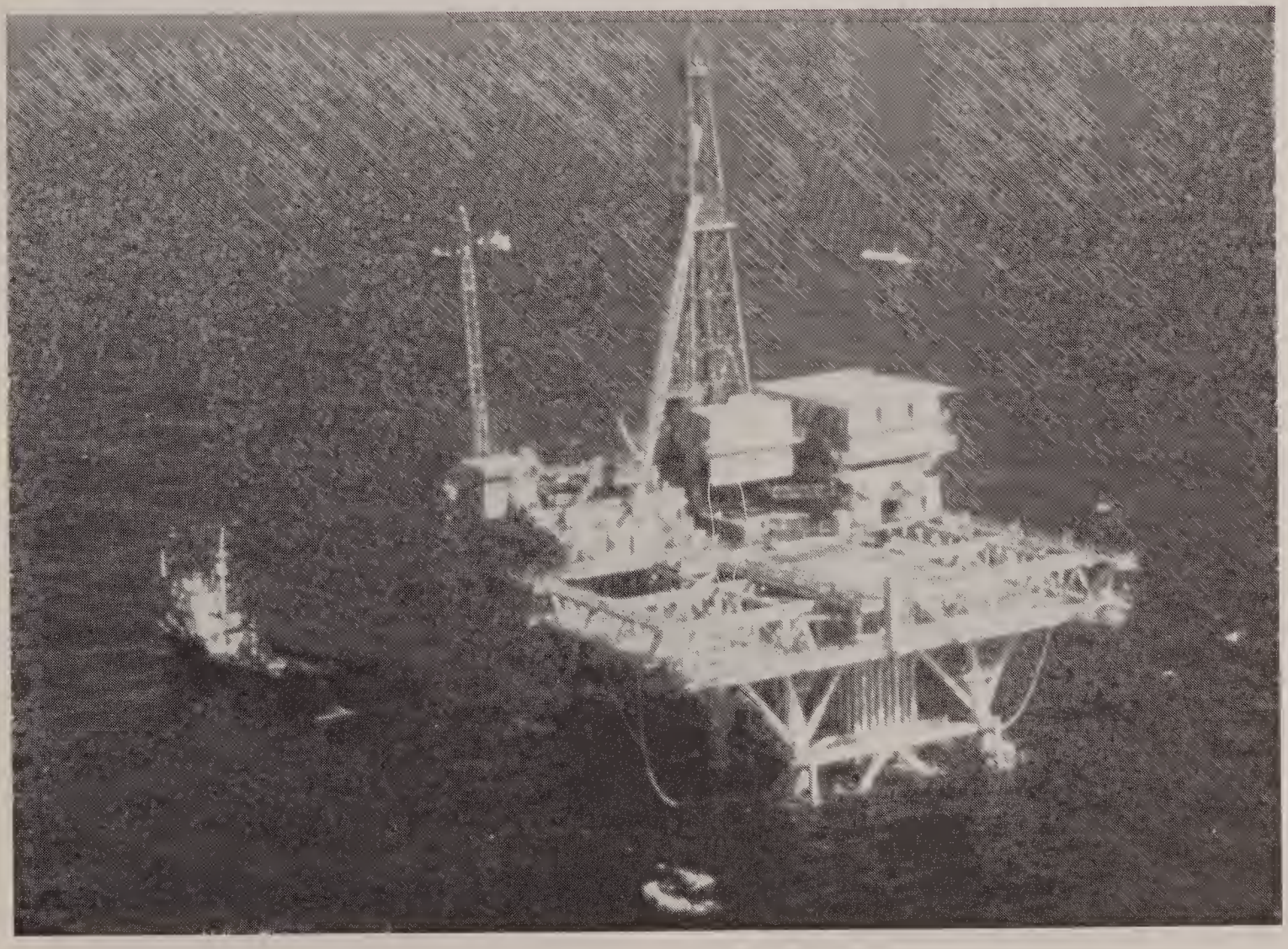


FIGURE 17. *Cognac—an OCS platform in 1,025 feet of water*

permit a well to be drilled through an opening in the hull called a moon pool. A drillship is capable of drilling exploratory wells in relatively deep water and is anchored or dynamically positioned over a well site.

The onshore facilities needed to support offshore exploration activity are limited to service and supply bases. These bases serve as the departure point for transporting personnel as well as supplies and equipment for rig operations.

2. *Development and Production.* The development and production phase of operations is marked by more intense activity offshore and onshore. The platform or other drilling structure is installed. Support facilities, if not already in place, are constructed; these include storage yards, pipelines, marine terminals, processing plants, etc. While crude oil produced offshore may undergo preliminary separation (of the gas from the oil) and treatment at the platform, both the gas and the oil must be transported to shore for additional processing and refining. Gas is transported by pipeline to shore facilities while crude oil is moved by pipeline, barge, or tanker.

A platform may accommodate from 1 to over 50 production and injection wells. The largest platform is Cognac (Figure 17) which is located in 1,025 feet of water in the Gulf of Mexico. It weighs 59,000 tons and has 62 well slots. Platforms remain in place for the estimated production life of the oil field which could be 30 or more years. Offshore wells are drilled directionally (at an angle) from a platform, and, depending on the size and shape of the oil reservoir, more than one platform may be required to develop a field. Because of the very high costs of platforms, economics dictate that a lessee use as few platforms as possible.

3. *Workovers.* During the well's productive life, operations known as workovers are required on occasion for well maintenance. A proposal to conduct these workovers must be submitted to the MMS for approval before their commencement. Workovers may be performed, for example, to repair wells with mechanical problems or to restore or increase production capacity. Upon completion of a workover, the lessee must submit a report to MMS describing the work completed and any changes made to the subsurface equipment.

4. *Platform Removal.* When necessary to permanently abandon wells and to remove the production platform, the lessee must submit a sundry notice giving the reasons for abandonment and describing the proposed work. The MMS requires the plugging of a well so that formation fluids will not migrate to the surface or from one subsurface zone to another. All well equipment on the seafloor must be removed to a depth of 15 feet below the seafloor, thereby completely clearing the well site of obstructions.

In a similar manner, MMS requires platform removal to a depth of 15 feet below the seafloor. All platforms must be removed from the lease by the end of the year following lease expiration.

Research has shown that platforms attract abundant life and can be environmentally safe if left in place. The National Fishing Enhancement Act and certain independent studies underway may result in some platforms being left in place or, as approved on a case-by-case basis, moved to other offshore sites to be used as artificial reefs. To date, only a very few platforms have been moved, although in one instance, a 2,200-ton structure was removed from its site offshore Louisiana and towed 300 miles where it was placed in 110 feet of water offshore Apalachicola, Florida. It is proving to be a very effective artificial reef supporting varied and abundant marine life for both sport and commercial fish.

H. Pipeline Approval and Inspection

Once marketable quantities of hydrocarbons are discovered, approval from MMS for the construction and maintenance of a pipeline must be obtained for transportation of the product to a shore-based facility.

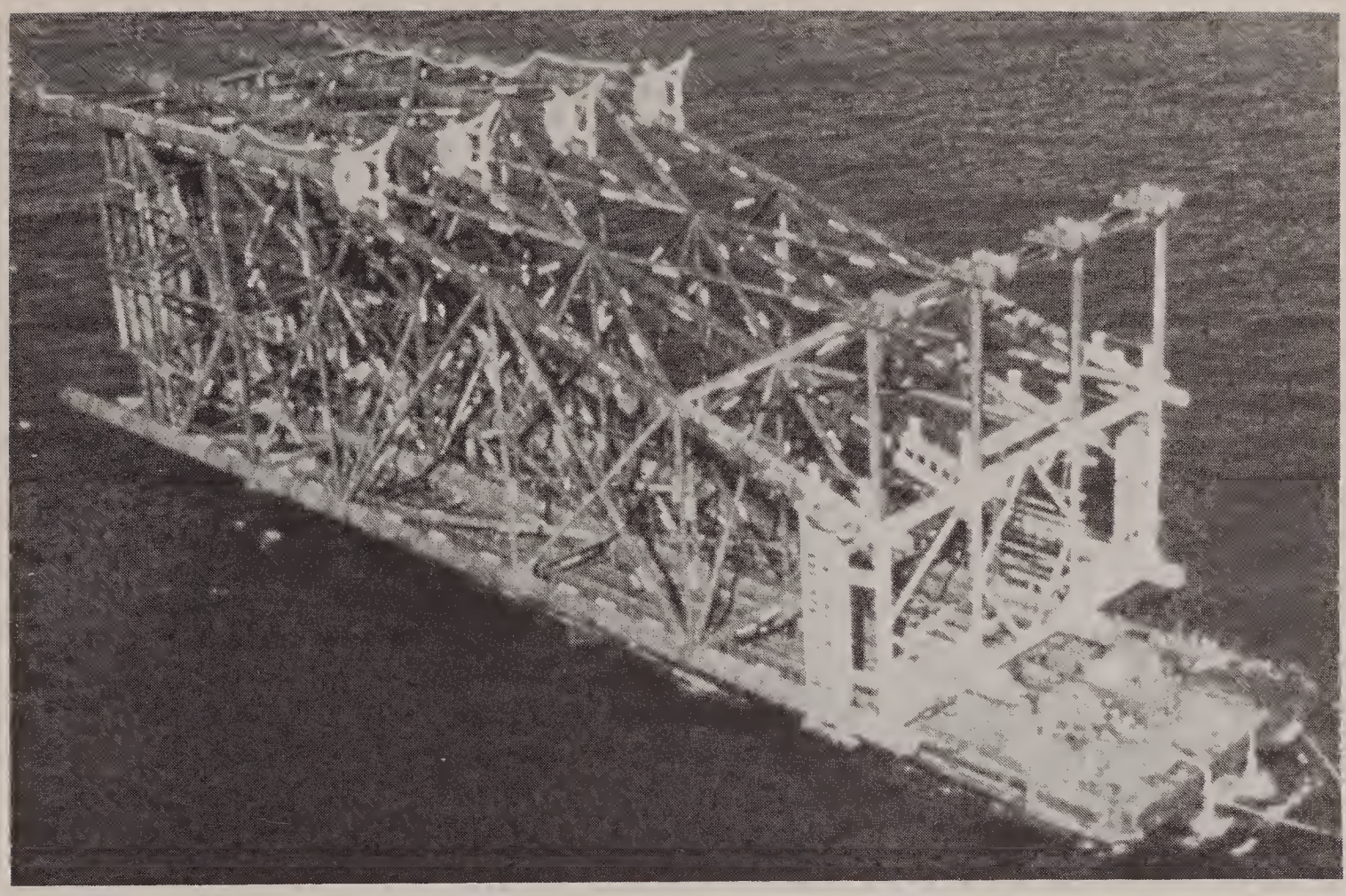


FIGURE 18. *Jacket of platform being towed on barge*

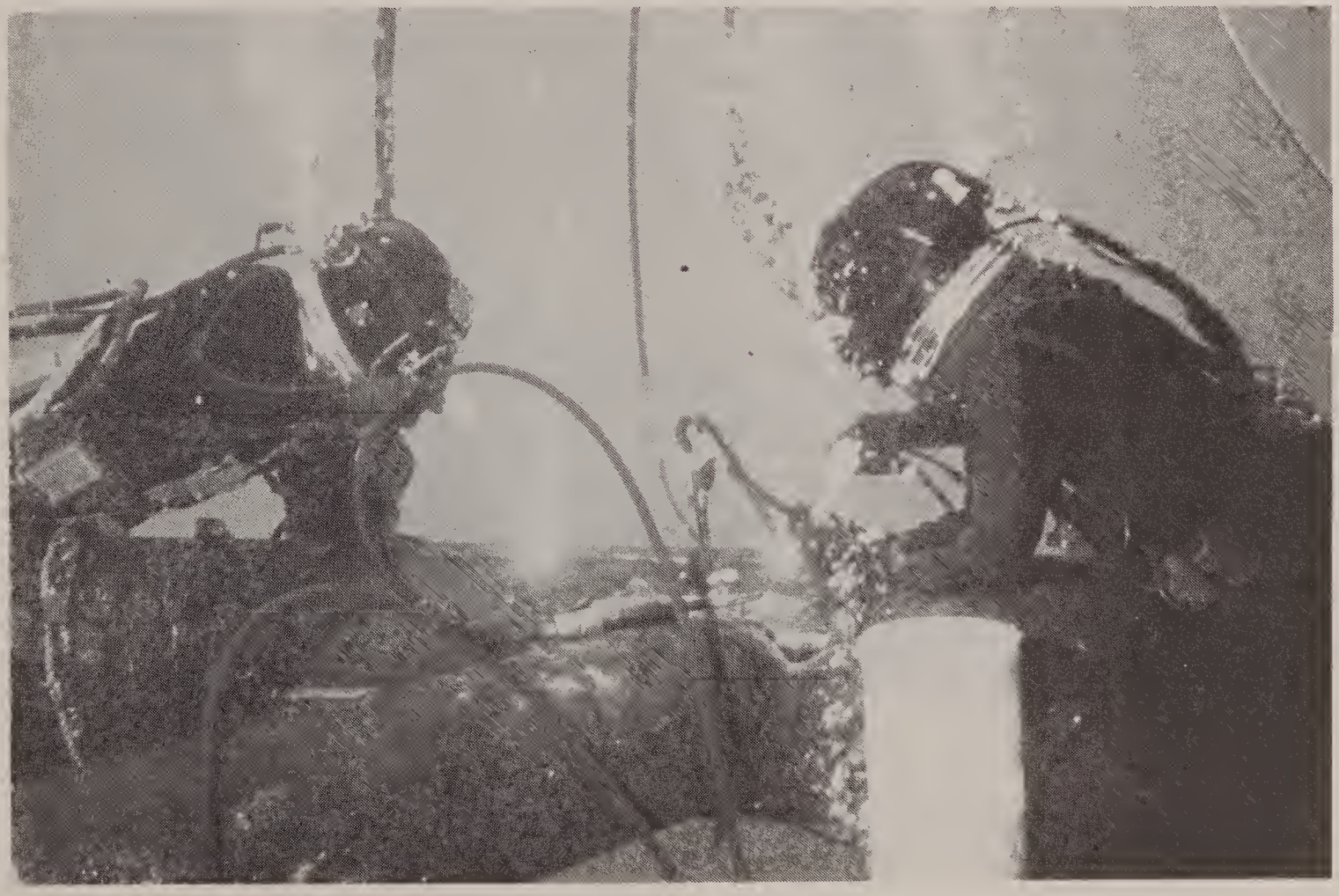


FIGURE 19. *Welders working on platform jacket*

FIGURE 20. *Installing a module on a platform*

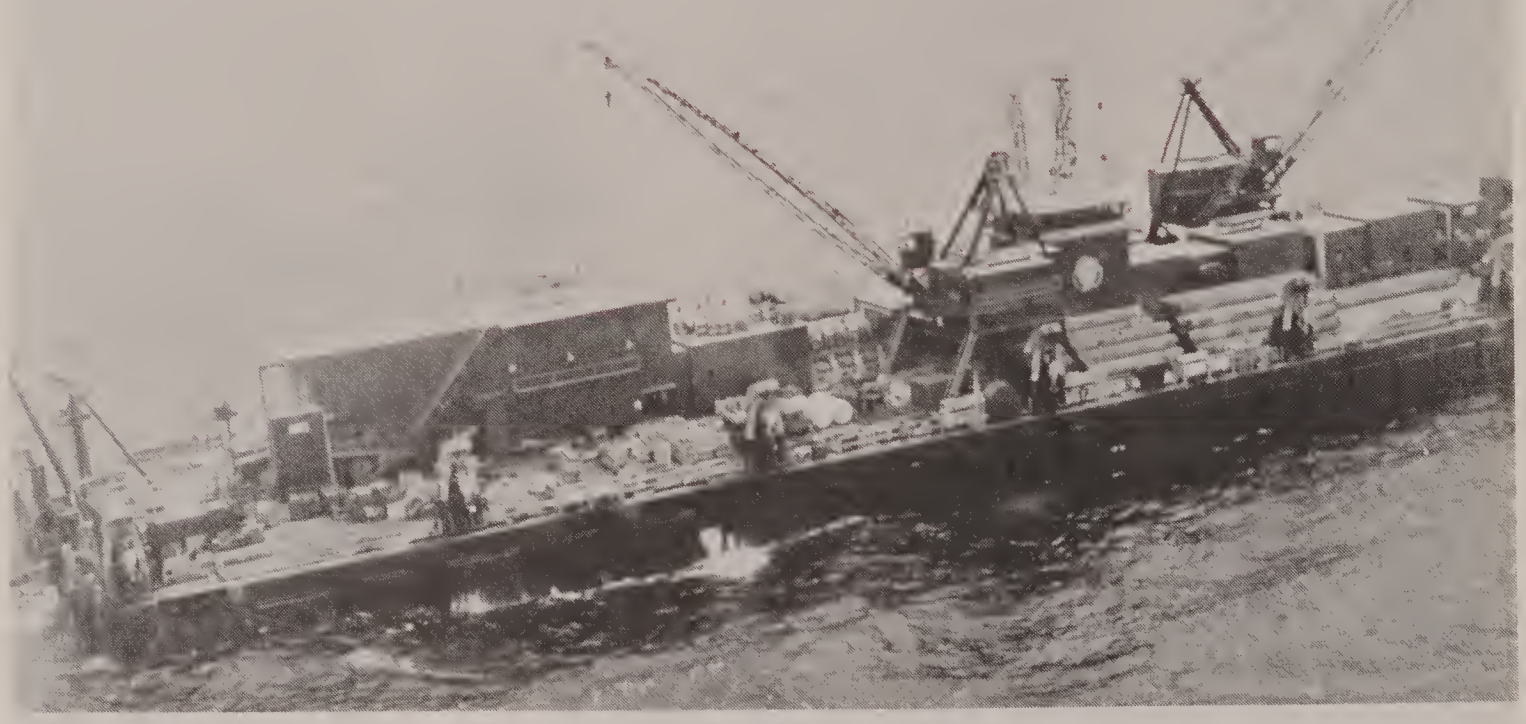


FIGURE 21. *Pipelaying barge*

The MMS has permit authority over all OCS pipelines. Pipelines that relate to production activities for a lease, unit area, or adjacent leases (not cornering) under common ownership are permitted under the provisions of a lease or a right of use and easement. Pipelines that carry production ashore or from production facilities to transmission pipelines are permitted through the issuance of a right-of-way.

The MMS reviews pipeline applications to ensure compliance with design requirements of applicable rules, referenced standards and operating and maintenance practices, and any pertinent lease stipulations. All pipelines must be designed to be protected against corrosion, water currents, storm scouring, soft bottoms, and other environmental factors. The MMS also requires that pipelines be installed and maintained so that they are compatible with trawling operations and other uses of the sea. For pipelines off the lease, conditions for approval include a requirement that there be compliance with DOT regulations. (An MOU completed in 1976 between the DOT and DOI delineates the division of jurisdictional responsibilities for OCS pipelines.)

Permitting authority for pipelines located in State waters is outside the purview of the MMS. If a pipeline extends into or across State waters, a copy of the pipeline application is sent to the affected State.

Besides approving pipeline applications, MMS inspects the installation of pipelines as well as existing OCS pipelines for compliance with applicable OCS rules, lease stipulations, and conditions of approval.

Chapter 7. Operations Policy

The MMS conducts its operations on the basis of policies stemming from the authorities described in previous chapters. Those policies are reflected in the chapter on plans, permits, and operations. Policies on specific subjects follow.

A. Proprietary Data

While most offshore exploration, development, and production activities are open to public scrutiny, the Federal Government recognizes that industry risks substantial sums of money in its search for oil and gas. Companies collect a great deal of data and information to evaluate the potential for resources, economic development, and production. Much of the information belongs to the company that collects it, and it is considered confidential or proprietary by that company. Upon submittal of certain information to the MMS, when required by regulation, the information is regarded as proprietary and is protected. Regulations provide that the MMS withhold all proprietary information for specific time periods. This precludes unauthorized use of the information by competing firms.

By regulation, geological data and analyzed geological information are not released for 2 years while interpreted geological information and all geophysical data and information are not released for 10 years. In the case of a deep stratigraphic test (DST) well, usually referred to as a continental offshore stratigraphic test (COST) well, the information is held for 10 years or for 60 calendar days after the issuance of the first OCS oil and gas lease within 50 miles of the site of the completed test.

A lessee may designate portions of an exploration plan to be exempt from disclosure under the Freedom of Information Act. However, the MMS is the authority as to the release of such designated portions.

B. Production Rate Control

Rates of withdrawal of oil and gas from reservoirs can affect ultimate recovery. If oil is removed at too great a rate from some reservoirs, less oil will eventually be recovered. With these reservoirs, withdrawal rates are carefully determined and controlled.

Rates of withdrawal are categorized as maximum efficient rates (MER) and maximum production rates (MPR). The MER is the maximum sustainable daily oil or gas withdrawal rate from a reservoir which will permit economic development and depletion of that reservoir without detriment to ultimate recovery. For a reservoir sensitive to a high withdrawal rate, the sum of the individual daily well production rates must not exceed the reservoir MER. If the production rates exceed the MER over a period of time, some of the oil in the reservoir will be left in place, and ultimate recovery will be reduced. The sensitivity of a reservoir is determined by conducting detailed studies or simulations of reservoir characteristics obtained from core samples, well logs and other sources. In practice, less than 10 percent of the currently producing OCS oil reservoirs and none of the gas reservoirs have been determined to be sensitive to high withdrawal rates.

The operator of a given lease is required to apply for an MER determination from MMS within a set time period after the date of first production. The operator proposes an MER on the basis of reservoir characteristics and economics, and MMS approves the proposal or takes other action as appropriate. Each year the operator reviews reservoir performance and data and resubmits an MER proposal, either the same or modified, for approval.

A more practical control measure is the MPR. It is the approved maximum daily

rate at which oil or gas may be produced from a specific oil or gas well completion. The MPR is determined on the basis of well tests and any limitations imposed by well and reservoir mechanics and by surface facilities. For oil well completions, a 4-hour test period is required quarterly. For gas well completions, a 4-hour test period is required semiannually.

The MER's and MPR's are determined quarterly. They are then published by reservoir for all producing leases.

Minimum production rates are not set by MMS nor are they controlled by specific regulations. However, by law, MMS is required to oversee diligence in all operations. Economics, in general, dictate to the lessee that higher rates are more profitable.

C. Suspension of Operations or Production

The OCS Lands Act provides for the issuance of leases for an initial period (primary term) of from 5 to 10 years and for extensions of the initial period. The implementing regulations provide for continuing a lease beyond its primary term when one of the following exists:

1. The lessee is producing oil or gas,
2. The lessee is conducting drilling, completion, or workover operations, or
3. The lessee has an approved "suspension of operations or production" which provides for continuation of a lease term.

A suspension of operations or production may be requested by a lessee or may be ordered by MMS. A lessee may request and receive approval for a suspension when unforeseen circumstances necessitate a significant halt or delay in operations. Circumstances that could cause such a delay include environmental or safety problems, difficult development or transportation construction conditions, and excessively long waiting periods for necessary Federal, State, or local permits or licenses.

A lease which is about to exceed its primary term and is not yet producing or being drilled will be considered for a suspension if sufficient exploration to delineate areas of production has been completed and development has begun. Development must be evidenced by a discovery of minerals in paying quantities and an approved schedule designed to lead to production. The MMS may order a suspension for several reasons, including one of the following:

- When there is a threat of immediate harm to life, property, or the marine, coastal, or human environment,
- When it is in the interest of national security, or
- When a lessee fails to comply with the provisions of the OCS Lands Act, rules, regulations, the lease agreement, or permits.

D. Unitization

Unitization means the joining together by agreement of operations of two or more oil and gas leases in such a way that the resulting entity is operated as a single lease. It leads to efficient exploration and development of a reservoir or field, and it provides a means for sharing production equitably from competitive reservoirs. The unit agreement is a contract between all parties holding an interest in a unit area. A unit area is limited to those leases encompassing a productive area of a reservoir or to those leases containing all or a part of a geological structure.

The MMS encourages unitization (1) when its engineers and geologists can establish that unitized operations will further the exploration of prospective geological structures, increase ultimate recovery of oil and gas reserves, or lead to more efficient exploration of leases and development of reservoirs, and (2) when it is necessary for the protection of correlative rights. Lessees may agree to voluntary unitization with approval by the MMS, or compulsory unitization may be imposed by MMS.

The MMS ensures, through the approval of exploration plans and development and production plans, that all lands within the unit area are properly and timely explored and developed. The lessee submits its proposed unit agreement, together with all

FIGURE 22. *Pipe sections stored in rack and on floor of offshore drilling unit*

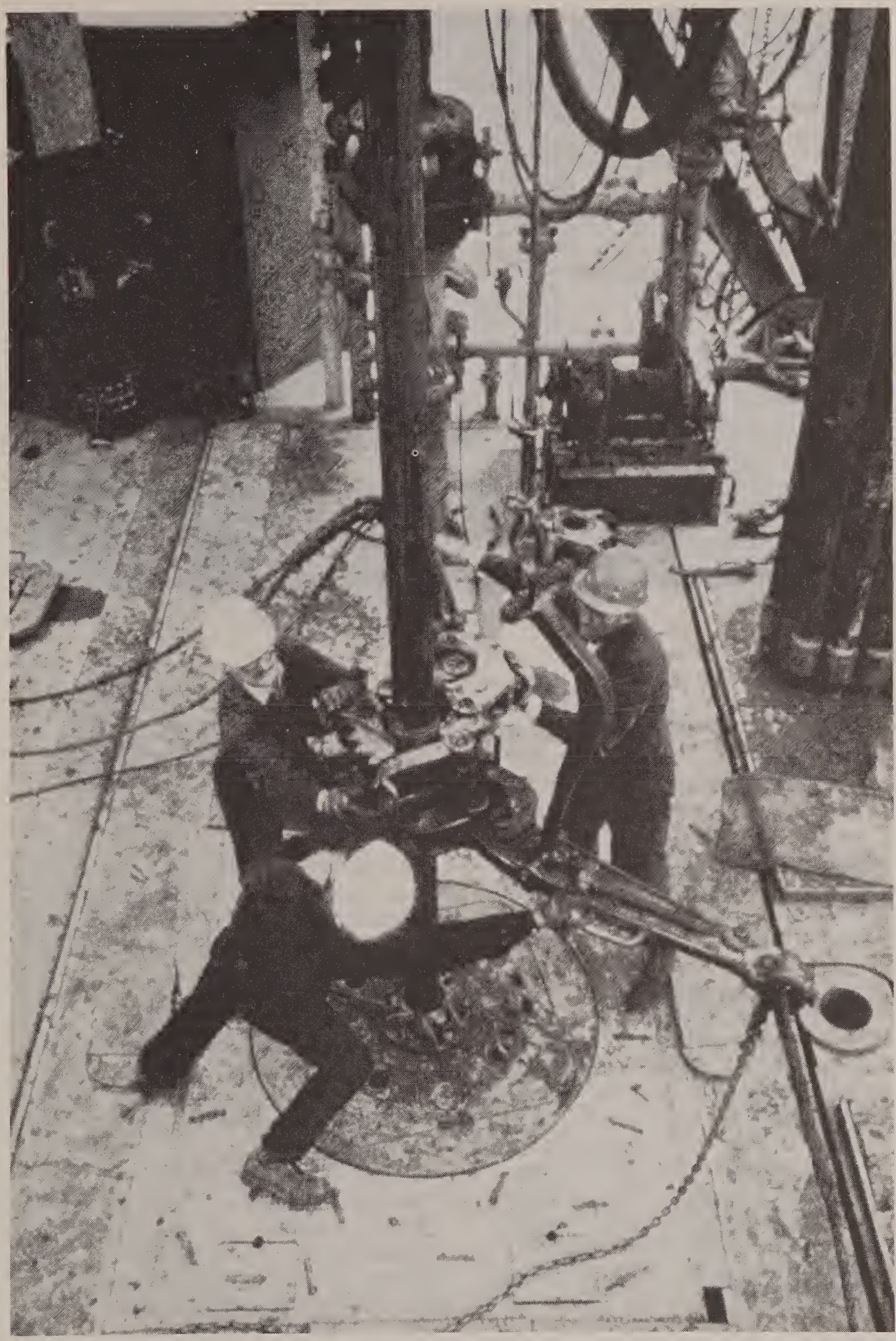


FIGURE 23. *Drill floor activity on the OCS*

FIGURE 24. *Monitoring offshore drilling*

necessary engineering, geologic, geophysical, and other supportive information and data, to MMS. The MMS reviews the material to see that the information and data justify the proposal, that the text of the unit agreement follows an approved model unit agreement, and that the initial exploration plan or development and production plan conform with the established policy on unitization and suspensions of operation.

E. Reserve Inventory

Regional MMS geologists and engineers inventory the reservoirs and estimate the reserves for the OCS. They gather the data, construct the geologic maps, calculate reservoir volumes, and estimate reservoir recovery. Additionally, they update previous reserve estimates by subtracting ongoing production and adding reservoir extensions to provide current reserves information and an annual public report for each Region.

The information is used as a check on industry submittals involving such matters as production rate control, approval of APD's, unitization of leases, and evaluation of lease sales. The reserves information is submitted biennially to Congress as part of a required report. Further, the computerized storage of reserves data by field is maintained on a current basis for internal use.

The reserves of interest are proven recoverable reserves, sometimes known as discovered reserves (as opposed to undiscovered resources). Included are reserves from reservoirs set apart as follows:

- Reserves from reservoirs being reduced by production,
- Reserves from reservoirs being expanded by drilling, and
- Reserves from reservoirs newly discovered, either within a field or of a wildcat nature.

Reserves by reservoir or by field are proprietary unless the operator agrees to release the information. Reserves by area are not considered proprietary and, therefore, are releasable.

F. Natural Gas Policy Act

The Natural Gas Policy Act (NGPA) establishes standards for price controls of

domestic natural gas. The standards vary depending on the "category" of the gas—a classification or division of the gas made on the basis of the requirements or specifications of the NGPA. The MMS makes the category determinations (e.g., new OCS lease, new reservoir on an old OCS lease, high-cost gas, etc.), and the Federal Energy Regulatory Commission (FERC) reviews and approves those determinations.

The category determination fixes the maximum legal price the applicant can collect. The maximum legal price varies for most categories and will change periodically. These changes are published as they occur by the FERC.

The process of determining gas categories begins with the lessee's application for a determination to MMS pursuant to the NGPA and FERC regulations. Lessees are required to submit specific detailed information to support each application and must publish a notice of each application in a local newspaper. The MMS personnel then make a category determination on the basis of independent analysis of the data in the application.

The application (FERC 121 Application Form) and the preliminary determination are made available to the public for a specific period of time in the MMS regional office to which the application is made. Comments from interested parties are considered, and a determination is forwarded to FERC for concurrence.

Although the price on some gas was decontrolled on January 1, 1985, under the NGPA, MMS must continue to make gas category determinations for that gas, i.e., MMS must certify that the gas qualifies under NGPA for the decontrolled price.

Chapter 8. Inspection and Enforcement Programs

A. Inspections of Oil and Gas Operations

One of the major program elements of MMS is the offshore inspection program. The MMS performs inspections of all oil and gas operations conducted on the OCS. The authority for conducting inspections is contained in the OCS Lands Act. The Act requires (1) scheduled onsite inspections, at least once a year, of each facility on the OCS which is subject to any environmental or safety regulations, and (2) periodic onsite inspections without advance notice to the lessee of such facilities. In carrying out this responsibility, MMS monitors the operation and testing of safety, pollution prevention, and metering equipment.

To facilitate inspections, the rules and regulations governing oil and gas operations are condensed into a checklist of "yes" and "no" questions. This checklist, used by inspection personnel, is a listing of potential incidents of noncompliance or "PINC's." A negative answer to any of the questions constitutes an incident of noncompliance or "INC."

Each INC requires that the person performing the inspection take a prescribed enforcement action. Enforcement actions are either warnings or shut-in orders. Warnings are issued for INC's that are not considered critical or do not create an immediately hazardous situation. These must be corrected within a specified period of time. When a shut-in order is given, corrective action must be taken before the specific operation can be resumed. A shut-in order can be given for a single component, well, portion of a facility, or for an entire facility. When an INC is not

FIGURE 25. *Helicopter pilot's view of OCS platform*

FIGURE 26. *Landing on a semisubmersible*

corrected within a reasonable amount of time (as stated on the INC), the lessee is liable for a civil penalty.

Inspections are performed by MMS petroleum engineering technicians who are stationed in district offices located near the areas of offshore operations. Travel to and from the offshore facilities is usually by helicopter although some minor unmanned platforms are accessible only by boat from nearby facilities. The inspections are conducted 365 days a year unless weather conditions (such as fog, wind, and hurricanes) are such that travel offshore is not possible.

All oil and gas operations conducted on the OCS are subject to inspections. New drilling rigs or production facilities are inspected before operations are allowed to commence. Once operations commence, drilling and production inspections are conducted on both scheduled and random bases. Well-workover and completion operations are inspected whenever possible. Pipeline and production metering facilities are also subject to inspections. In addition, the MMS may witness such operations as well-testing and abandonment.

The MMS inspection program is one of the contributing factors to the high degree of compliance with regulations by offshore lessees and the low level of accidents and pollution incidents.

B. Verification of Measurement Facilities

The verification of production measurement procedures and certification of facilities and equipment are functions of the MMS inspection program. Because all royalty payments that the Federal Government receives are based on the volume of hydrocarbons saved, removed, or sold, the use of proper procedures and accurate measuring equipment is critical.

Two types of liquid hydrocarbon metering equipment are used offshore—tank gauges and automatic custody transfer (ACT) units. Tank gauges are calibrated-volume tanks where a steel tape is used to determine liquid levels in the tank before and after the delivery of crude oil and condensate. The ACT units are composed of a meter or meters, a calibrating device, and a flow-sampling device with a vapor-tight sample container. Measurement must

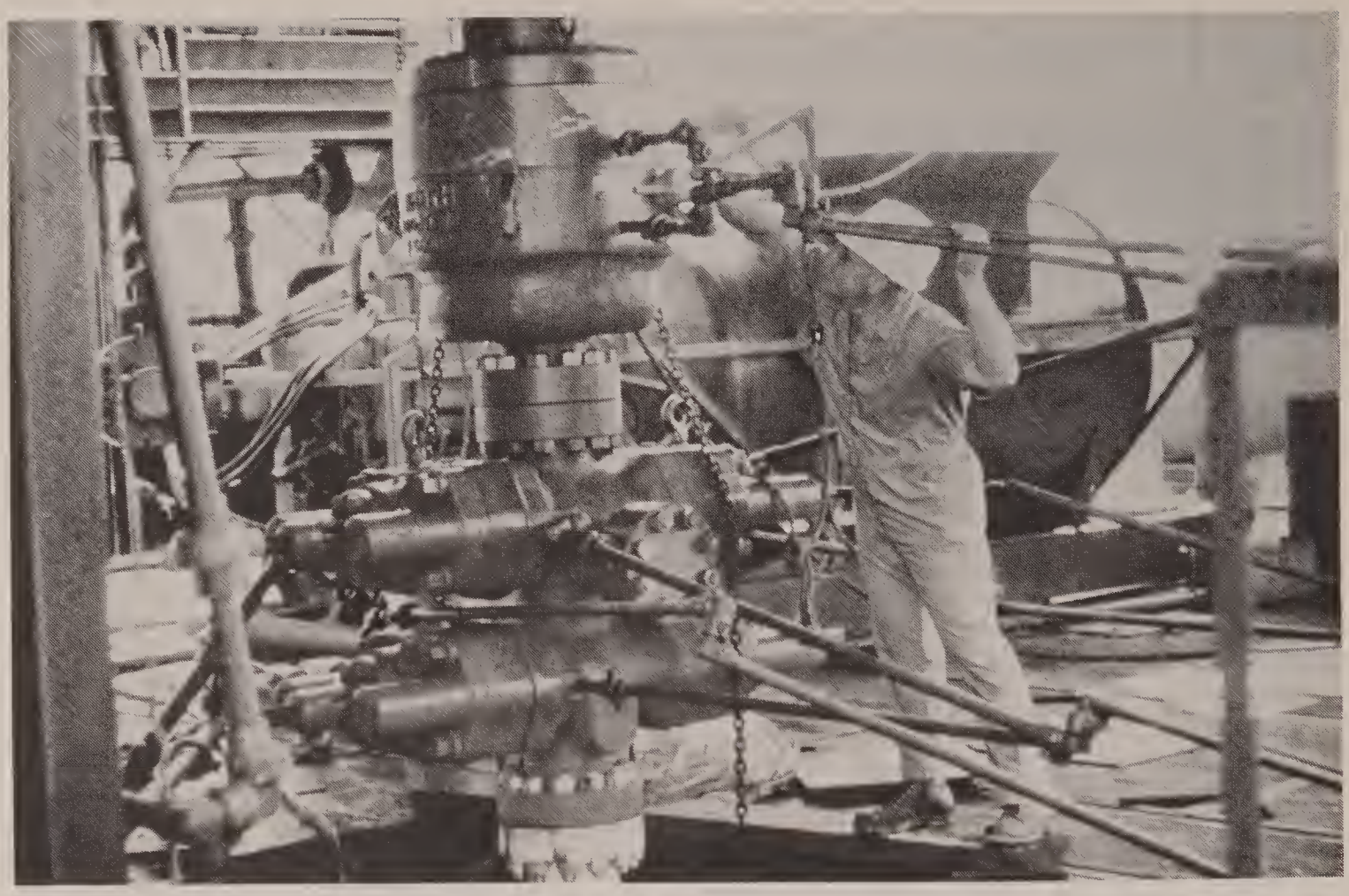


FIGURE 27. *Inspecting a blowout preventer on a platform*

be performed at or just above atmospheric pressure.

Essentially all natural gas produced offshore is measured using simple orifice-type meters. The volume measured is adjusted to standard temperature and pressure conditions for consistency.

All of the equipment mentioned above must meet certain requirements. Before actual production and measurement of hydrocarbons, the lessee requests MMS approval of an application that describes in detail the measurement method to be used and the location of all measurement equipment. Once the facilities containing the measurement equipment are approved by MMS, they are subject to inspection for compliance with rules, regulations, and the specifically approved application.

Commingling (mixing of production from different wells, leases, pools, and fields) of hydrocarbons is also subject to approval in the same application.

Accurate measurement equipment is required to allocate the commingled production back to each well.

Included in the inspection of measurement equipment is the witnessing of meter-calibrating operations. Sales meters are calibrated once each month to determine a meter factor. This factor is a ratio between a volume of liquid as measured by the meter to a known volume. The meter factor is used to adjust produced volumes to account for any discrepancy. The MMS inspection personnel witness calibrations to ensure compliance with proper procedures.

Coordination within MMS between Royalty Management (RM) and Offshore Minerals Management (OMM) is important in the collection of the correct royalty due the Federal Government. If OMM inspection personnel detect irregularities in the measurement of production, RM personnel are notified, and action is taken to collect or credit any royalties in question. Similarly, if RM personnel detect irregularities in reporting or payments, OMM inspection personnel are contacted to investigate or inspect the subject facilities.

C. Training

The MMS requires that lessee and drilling contractor personnel be trained and

qualified in accordance with the MMS standard MMSS-OCS-T I, "Training and Qualifications of Personnel in Well-Control Equipment and Techniques for Drilling on Offshore Locations." This standard includes guidelines for training course curricula and the qualification procedures for personnel employed as rotary helpers, derrickmen, drillers, toolpushers, and operators' representatives. All personnel employed on the OCS in one of these five occupations must attend an MMS-certified well-control school and pass a test. Documentation of the completed training must be available at the site of each individual's employment.

Organizations desiring to conduct well-control training courses must submit applications to MMS which include descriptions of their training programs and course curricula. This information must meet the requirements of the MMSS-OCS- T 1 standard to qualify for MMS certification. The MMS also conducts an onsite evaluation of each school prior to granting certification. Once certified, a school is subject to unannounced audits by MMS personnel.

Personnel employed as rotary helpers and derrickmen are required to attend a training course for their level of employment once within the first 6 months of their employment. Persons employed as drillers, toolpushers, and operators' representatives must attend a basic course in well control every 4 years and a refresher course at least once a year. Basic courses are normally 4 days long—refresher courses, 1 day. To upgrade a qualification (driller to toolpusher or toolpusher to operator's representative), a person must attend the basic course again. The MMS offshore inspection force, as part of its routine inspection procedures, checks records on each offshore facility where drilling personnel are employed to ensure that all persons are qualified in well control.

The MMS also requires that all persons involved in installing, inspecting, testing, and maintaining safety devices on production facilities be qualified in these areas. To qualify, these persons must attend a training program recommended by the "American Petroleum Institute Recommended Practice for Qualification Programs For Offshore Production Personnel Who Work With Anti- Pollution Safety Devices (API RP T-2)." Documented evidence of the qualifications of persons performing these functions is made available by the lessee for MMS inspection.

D. Accident Investigations

If an accident related to oil and gas operations occurs on the OCS, the lessee notifies MMS. Immediate notification is required for all serious accidents. Notification within 24 hours is required for all other accidents, unusual conditions, problems, or malfunctions.

The MMS separates accidents into two categories as follows:

MINOR	Fire or explosion which results in equipment/structural damage of less than $1 million. Hydrocarbon spillage of less than 200 barrels during a period of 30 days.
MAJOR	Fire or explosion which results in equipment/structural damage of $1 million or more. Hydrocarbon spillage of 200 barrels or more during a period of 30 days. A death or serious personal injury which causes substantial impairment of any bodily unit or function.

The definition of major accident is taken from the OCS Lands Act. The $1 million figure for major damage was selected by MMS as reasonable.

Accidents occurring on the OCS are investigated by MMS or USCG, or by both jointly. An MOU, dated December 18, 1980, involving the USCG and the MMS, identifies the separate and joint responsibilities for accident investigations. The MMS investigates accidents related to drilling and production operations, and the USCG investigates accidents involving injury or death and accidents related to vessel operations. Considerable overlap exists in these responsibilities. Consequently, many investigations are conducted jointly.

The degree to which an accident is investigated depends on its severity. Major accidents are always investigated, and the investigation includes an onsite inspection. The MMS may form an investigative panel for a major accident. An investigative panel, which consists of district, regional, and headquarters personnel, and possibly USCG and National Transportation Safety Board representatives, may hold meetings and subpoena witnesses during the conduct of an investigation.

The degree of investigation for minor accidents is determined by the District Supervisor. In some cases for very minor accidents, the report filed by the operator is considered sufficient for purposes of investigation. However, as mentioned above, all accidents must be reported to MMS, and in all cases, a written report is filed. Reports of all accidents on file with MMS are available to the public upon request.

E. Civil Penalties

The OCS Lands Act authorizes MMS to assess civil penalties for violations of any provisions of the Act or the rules, regulations, leases, licenses, or permits issued pursuant to the Act. A penalty of up to $10,000 per day may be assessed against any person (lessee) for any violation after notification and a reasonable amount of time has been allowed for the correction of the violation.

If a civil penalty case is opened, the alleged violator is provided an opportunity for a hearing. The MMS assigns a hearing officer (a person without previous involvement in the case) to each potential civil penalty case. The hearing officer—after reviewing all evidence, the results of any hearings, and other pertinent information—assesses a penalty or decides that no penalty is warranted. All penalty assessments may be appealed to the Director, MMS.

In addition to the civil penalties mentioned above, the OCS Lands Act provides for criminal penalties for persons who knowingly and willfully violate the provisions of the Act or the rules, regulations, leases, licenses, and permits issued pursuant to the Act. The criminal penalties also apply to persons who make any false statement, representation, or certification in any application, record, report, or other document; falsify, tamper with, or render inaccurate any monitoring device; or reveal any data or information required to be kept confidential. Persons committing these types of violations are liable for fines of up to $100,000, imprisonment for up to 10 years, or both.

Chapter 9. Technology Assessment and Research

The OCS Lands Act specifies that the best available and safest technologies (BAST) which are economically feasible shall be used on all new drilling and production operations and wherever practical on existing operations. For MMS operations, this concept of BAST has been interpreted by the Marine Board, National Academy of Engineering (1979), as the application of technology in the form of equipment, systems, procedures, and trained workers to ensure the highest degree of operating safety and reliability within reasonable economic constraints. In order to specify what MMS considers to be a safe level of operations, Federal rules, regulations, and standards have been developed to define and interpret acceptable levels of performance that must be met by the offshore petroleum industry. Among these measures are a well-control training certification program and a platform verification program. These measures are in turn supported by a technology assessment and research program and a technology transfer network.

The technology assessment and research program is subdivided into three categories—structures and pipeline behavior and inspection, well control, and oil spill containment and cleanup. The program is conducted on a contract basis with contracts awarded to academia, private industry, and Federal laboratories. This includes the operation of a major oil spill equipment testing facility which is under the purview and support of the EPA, MMS, USCG, U.S. Navy, and Canadian Environmental Protection Service. The test facility, called the Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT), provides a large tank for the testing and development of devices and techniques for the control and cleanup of oil spills. The test program includes tank tests with broken ice to simulate arctic conditions and instrumented offshore real-time tests.

The MMS offshore technology transfer network consists of groups in each regional office and in headquarters to enhance communications between the research and operations communities. These groups, known as operations technology assessment committees, meet periodically to discuss operational problems and to interface with the technology assessment and research program and its research investigators. This represents a concerted effort in the MMS to manage technology and technological information and to implement the concept of BAST.

Chapter 10. Revenues

Revenues collected by MMS after leases are issued consist of rentals and royalties (or profit shares) which are described below. In addition to rentals and royalties, OCS lessees are subject to the Federal income tax laws; since 1980, they have also been subject to the "windfall profits" tax on sales of crude oil.

Rentals are due each year before the anniversary date of each lease. The rental rate is typically $3 per acre or $8 per hectare. Following the discovery of hydrocarbons, the lessee pays a minimum royalty equivalent to the yearly rental. If there is production on the lease and the royalty paid on actual production is less than the minimum royalty, the lessee must pay the difference between the actual royalty and the prescribed minimum royalty to bring the total paid up to the minimum royalty. For this reason, minimum royalty is due at the expiration of each lease year beginning with the first lease year following a discovery on a lease.

The royalty (or profit share) rate for each tract is stated in the notice of sale. Royalty payments begin when production begins. Generally, royalty payments owed the Federal Government are based on a percentage of the value of essentially all of the extracted minerals. Fixed royalty rates to date have varied from 12½ to 33⅓ percent. Instead of a fixed royalty rate, a particular lease may contain (1) a provision for a sliding scale royalty rate (generally with a minimum of 12½ or 16⅔ percent rate to a maximum of 65 percent), or (2) a provision whereby the Federal Government would receive a share of the net profits made by the lessee. The royalty due the Federal Government may be taken in value or in produced oil known as

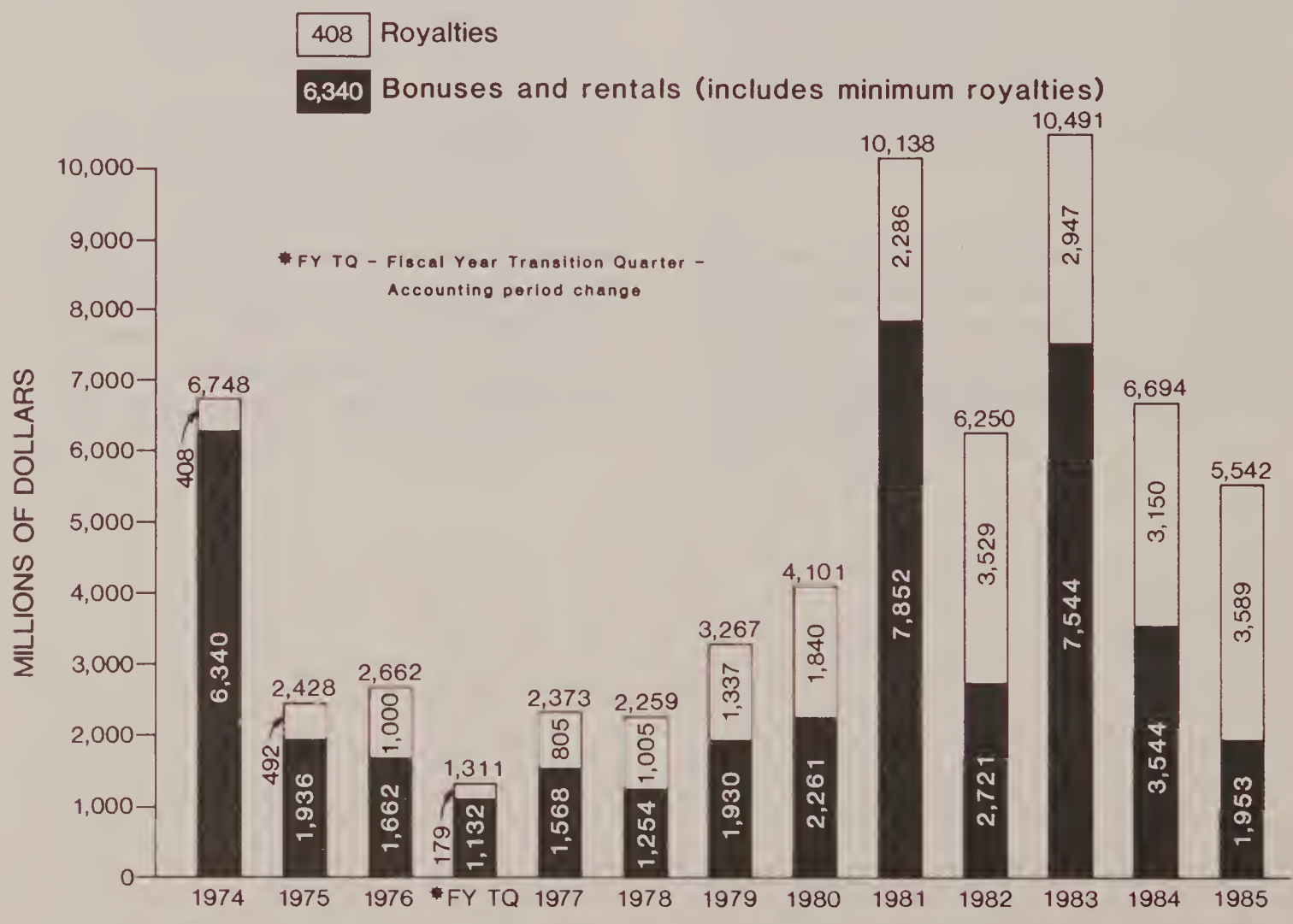


FIGURE 28. *Revenue from oil and gas leases on the OCS*

royalty-in-kind. Royalty taken in value is a monetary payment by the lessee while royalty-in-kind is a payment by the lessee of crude oil itself. (The Federal Government then sells the crude oil to eligible refiners who in turn pay for the value of the oil in the form of a monetary payment.)

The OCS leasing revenues are deposited into accounts of the U.S. Treasury. Figure 28 shows revenues from bonuses, rentals, and royalties received from OCS oil and gas leases, 1974 through 1985. Some of the revenues from OCS leases are credited to two special funds, the Land and Water Conservation Fund and the Historic Preservation Fund, created pursuant to the Land and Water Conservation Fund Act and the National Historic Preservation Act. Current legislation dictates that the Land and Water Conservation Fund be credited with $900 million annually. The fund draws most of its income from Federal receipts from OCS oil and gas leasing. The transfers of OCS revenues to the Land and Water Conservation Fund amounted to $789 million in FY 1984 and to $784 million in FY 1985. Transfers to the Historic Preservation Fund have amounted to $150 million annually since 1980. Under recent amendments to section 8(g) of the OCS Lands Act, a portion of the revenues from certain leases is distributed to Coastal States.

Chapter 11. The Future of Offshore Oil and Gas Development

A. General

The DOI has recently assessed undiscovered economically recoverable offshore oil and gas resources and has concluded that the offshore waters of the Pacific and the Gulf of Mexico are expected to produce most of such resources in the near term. The resources are found at various depths—from a few feet to 600 feet on the shelf and up to 10,000 feet on the slope. Additional resources may be found in even deeper waters of the continental rise which extends to a depth of 13,000 feet. Recent exploration activity off the Alaskan and Atlantic coasts has not yielded significant discoveries.

Physical and geological hazards in deepwater environments have significantly influenced the design and siting of platforms, drilling operations, and subsea production and transportation equipment. Although the advance of technology for production and transportation has been slow, that for exploratory drilling has been fairly rapid. Technological advances in the areas of dynamic positioning, wellbore reentry systems, electrohydraulic blowout preventer controls, and riser systems have enabled industry to extend the search for offshore oil and gas to increasingly deeper water.

Utilizing state-of-the-art survey systems, industry has obtained high- resolution seismic data in water depths up to 6,900 feet. Current systems are designed for surveying to approximately 10,000 feet. In conducting geological investigations in deep ocean waters, the National Science Foundation, using the drillship, Glomar Challenger, has drilled without blowout preventers in waters deeper than 23,000 feet and has penetrated more than 5,700 feet beneath the ocean floor. Such deepwater boreholes are drilled to obtain geological data and are specifically sited to avoid oil and gas.

Because bottom-supported, jack-up drilling units are limited to a maximum water depth of 400 feet, deepwater drilling requires the use of a floating unit, either a semisubmersible or a drillship. The deepest water in which an exploratory well has been drilled, through 1985, was in 6,952 feet of water off the New Jersey coast by the dynamically positioned drillship, Discoverer Seven Seas. With minor improvements to current technology, a well probably could be drilled in 10,000 feet of water.

The conventional steel-jacketed, bottom-supported production platform is limited to a water depth of about 1,500 feet in relatively calm water. The deepest such platform currently installed is Cognac which is in 1,025 feet of water in the Gulf of Mexico. In 1983, a compliant guyed tower, Lena, was installed in 1,000 feet of water in the Gulf of Mexico. A compliant guyed tower consists of a slender, steel, trussed column. It has a constant cross section which is bottom-fixed and held in place by a radial guyline mooring system. The design is believed to be capable of operating in waters of up to 2,000 feet.

A tension-leg platform (TLP), installed in the North Sea, will provide the first full-scale test of TLP deepwater production technology. While this TLP is installed in relatively shallow waters, its capability may well be extended to deeper waters of up to 3,000 feet. The TLP consists of a large semisubmersible platform moored by means of vertical tethers to anchors on the seafloor. Tension is maintained on the tethers so that the bouyancy of the platform results in an upward pull on the mooring lines, thus preventing vertical movement but not lateral movement of the platform.

As an alternative to a fixed platform, industry can use a subsea well system in certain

situations. With subsea completions, all well controls are located on the seafloor and are serviced in part by divers, controlled manipulators, or remotely operated submersible vehicles. However, use of a subsea system does not eliminate surface occupancy as service vessels may be required for varying amounts of time and the produced oil must be delivered to a platform or a nearby moored tanker.

All subsea wells have been single completions with the deepest one being in 1,273 feet of water. The most sophisticated production system utilizing an underwater manifold was installed in 1982. The manifold is tied into over 9 wells in 500 feet of water in the North Sea. It is serviced by a surface-controlled mechanical manipulator.

The deepest operating pipeline was laid by an Italian firm in approximately 2,000 feet of water in the Mediterranean Sea between Algeria and Sicily. With some enhancement to current technology, pipelines can be laid in approximately 3,000 feet of water. In addition to the use of pipelines, industry has developed various types of mooring systems to enable tankers to receive crude oil from subsea production systems. A single-point mooring system has been used in 533 feet of water, and present technology will allow existing systems to be used in water depths up to 2,000 feet.

B. Arctic Technology

The foundation for further development of technologies in arctic offshore regions has been laid through earlier experiences in the North Sea, Alaska's Cook Inlet, the Gulf of Alaska, the Canadian Arctic, and the Beaufort Sea.

1. *Structures and Facilities for Exploration, Development, and Production.* Experience gained from drilling in U.S. arctic waters is limited primarily to the drilling of exploratory wells from natural barrier islands and manmade gravel islands (Figure 29(a)). To date, three manmade gravel islands have been constructed in Federal OCS waters ranging in depth from 19 to 48 feet. In addition to those on the OCS, several artificial islands have been constructed in State of Alaska waters. The gravel island achieves its strength to resist ice forces by its large mass, and ice rubble buildup around the perimeter enhances the structure's resistance.

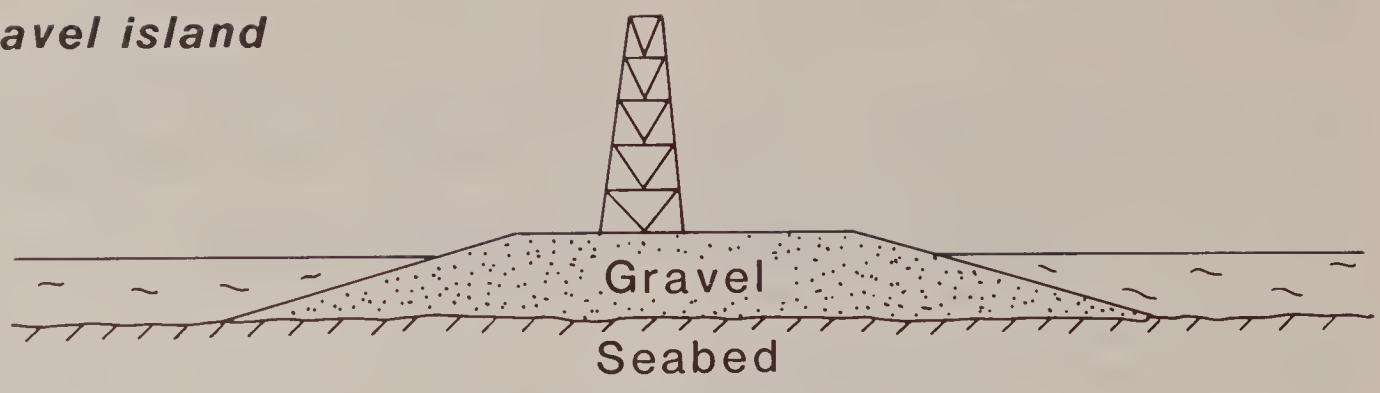
The degree of permanency afforded by manmade gravel islands and their potential for expansion as production islands in the event of a commercial discovery have made such islands attractive despite their high costs and the scarcity of gravel.

One means of mitigating the erosion that can occur to manmade islands is the construction of caisson-retained islands. These consist of a rigid peripheral wall called the caisson with dredged material placed inside the wall (Figure 29(b)). Ice forces are resisted by the combined mass of the caisson and the dredged material. The design economizes on the amount of required gravel and permits the drilling to proceed year-round. Once drilling is completed, the center core of earth fill is dredged out, the caisson refloated, and the structure moved to a new location.

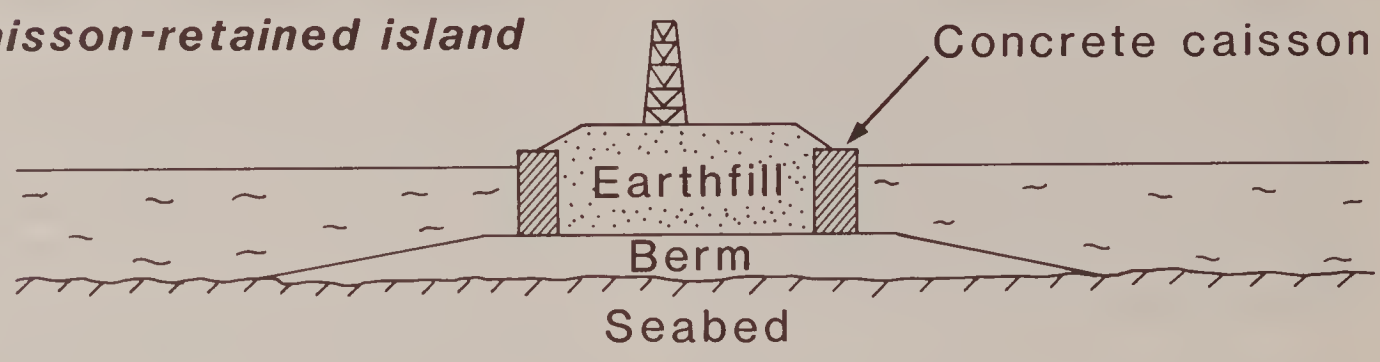
Conical-gravity structures are the likely choice for drilling and production in water depths between 130 to 230 feet. These structures are designed with a large diameter base, a cone section, and a deck section (Figure 29(c)). The large base serves to provide stability against sliding and overturning and provides buoyancy during towing of the structure from its fabrication point to the installation site. The conical section is intended to cause flexural failure of the ice rather than crushing as in the caisson-retained island. The basic principle of this concept is to permit the moving ice to flow past the structure with minimum resistance.

Where large production capacity or large oil-storage capacity is desired, caisson gravity structures might be used. These structures contain large crude-oil storage tanks. They incorporate a very large polygonal caisson, the walls of which may be either vertical or sloped, depending on ice conditions (Figure 29(d)). The caisson relies on its great mass and strength to resist ice loads.

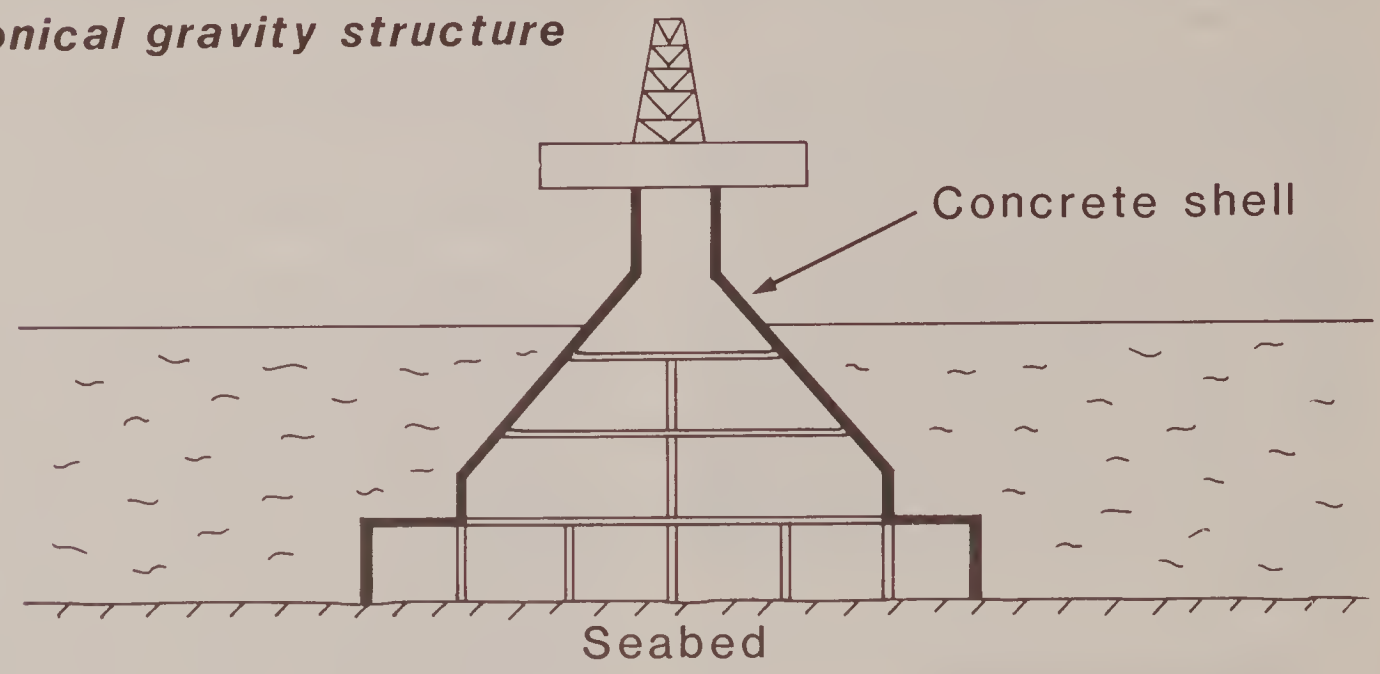
a) Gravel island



b) Caisson-retained island



c) Conical gravity structure



d) Caisson gravity structure

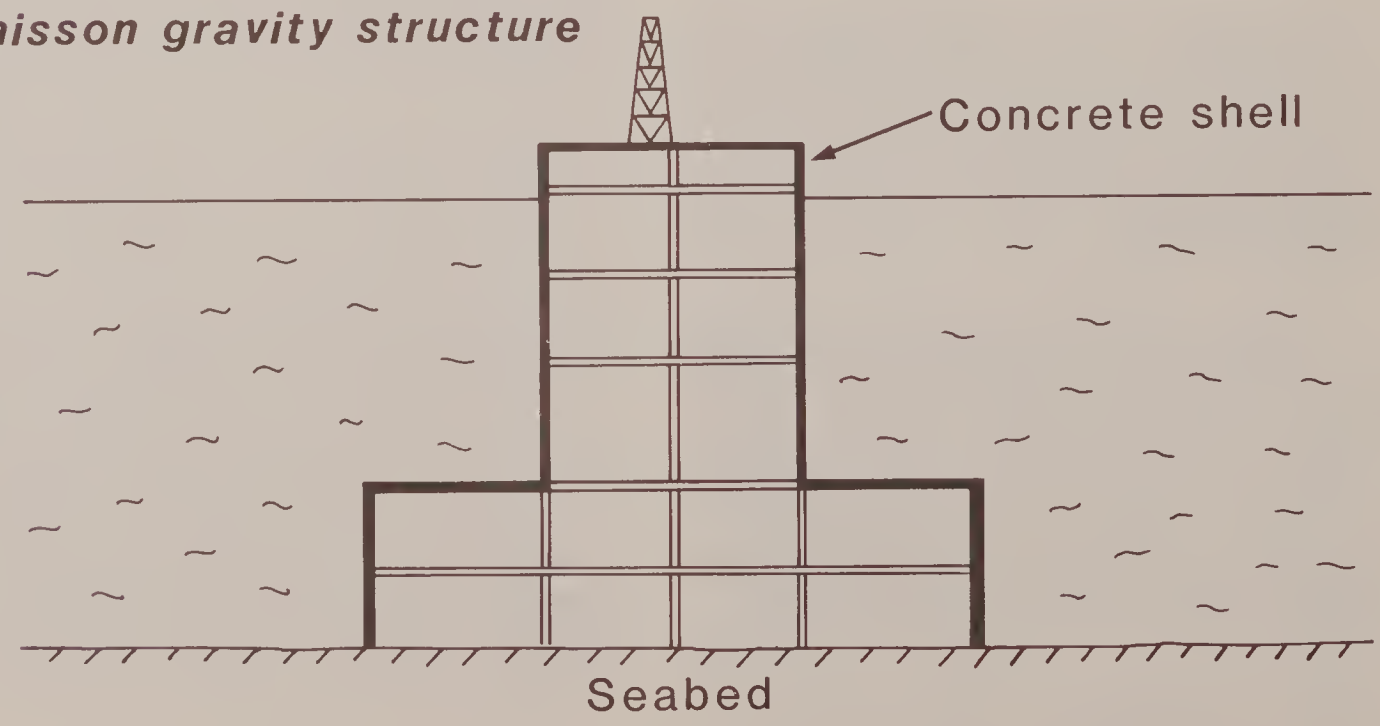


FIGURE 29. *Generic types of offshore structures proposed for the Arctic*

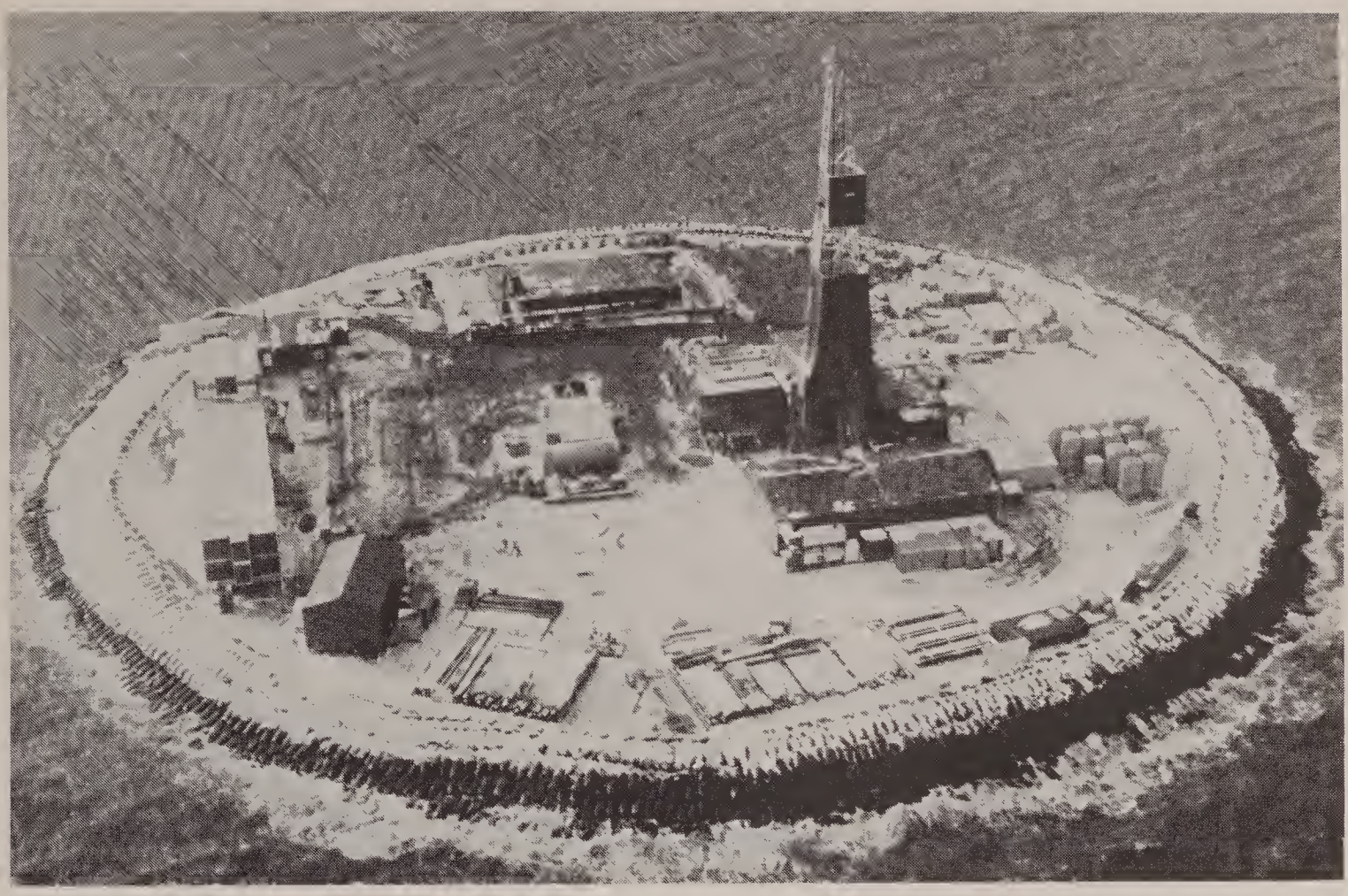


FIGURE 30. *Gravel island*

FIGURE 31. *Ice-strengthened drillship*

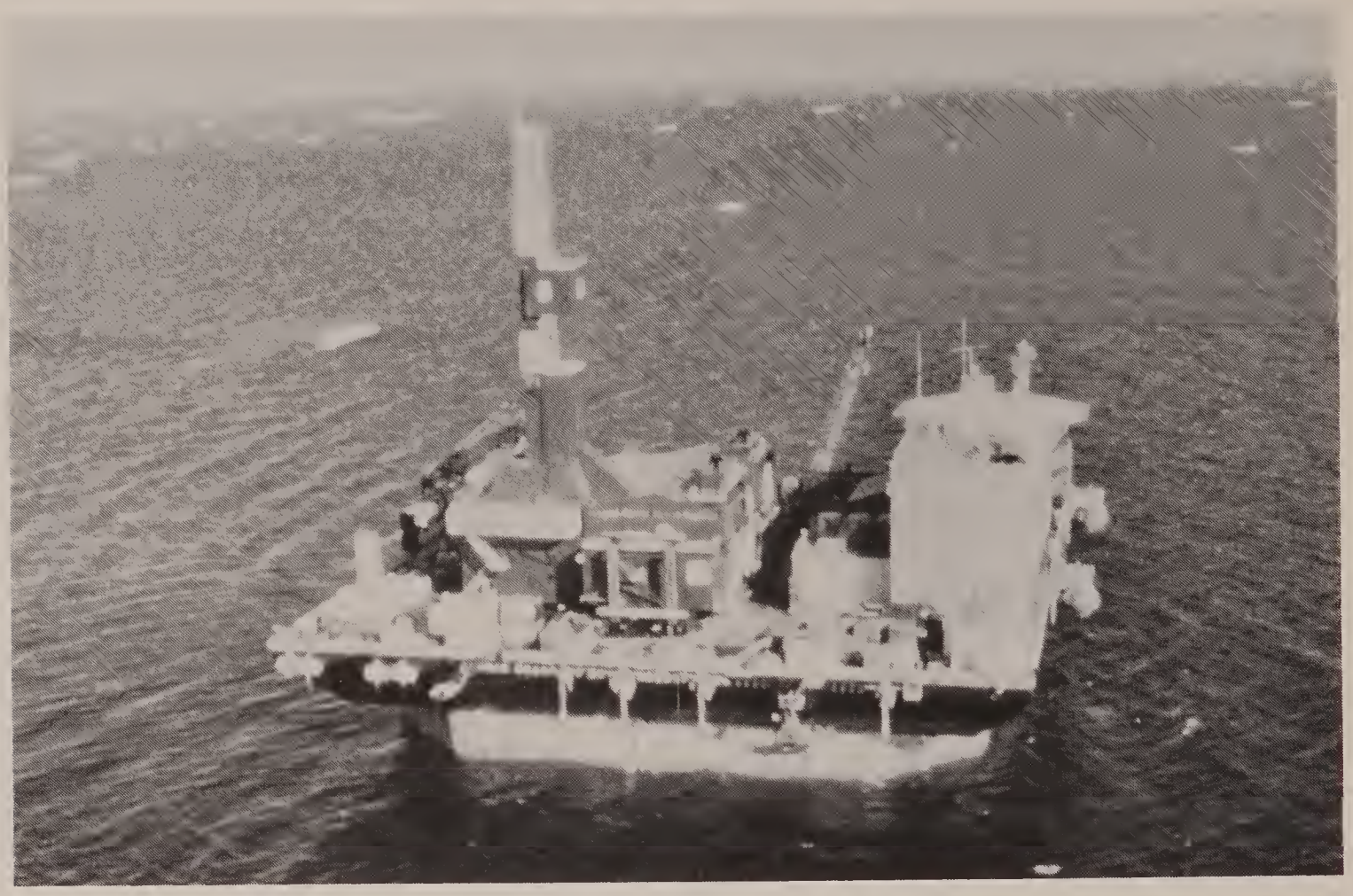


FIGURE 32. *Concrete island drilling system*

A concrete island drilling system (CIDS), composed of modular concrete "bricks" (stacked one on top of the other) that support a barge-mounted drilling unit, is being used for exploratory drilling in the Beaufort Sea. Sequentially stacking these modules provides a great deal of flexibility in siting the structure in water depths of 18 to 52 feet. The entire system can be relocated by pumping out the salt water ballast and towing the CIDS to a new site.

Depending upon the site-specific environmental conditions, the size of reserves, economics, and the viability of technology, some types of subsea completion systems may be used under arctic conditions.

2. *Pipelines in the Arctic Region*. One of the major challenges in arctic waters is the protection of pipelines. Large ice features such as pressure ridges and ice fragments can scour the seabed and pipelines. For protection, pipelines may be buried in trenches dredged in the seabed to a depth below the scour line or they may be placed in or on berms—built-up embankments put in place to carry the pipelines.

Permafrost is generally not a problem beyond the 6- to 8-foot water-depth contour; however, there are exceptions because permafrost can be found at these and greater depths. In any case, some form of insulation is needed to prevent the hot crude oil in a pipeline from thawing the permafrost. Gravel is often used for this purpose.

3. *Transportation of the Oil and Gas*. Crude oil produced in the Beaufort Sea likely will be gathered from the wells, transported by a larger "trunk" pipeline to shore, and then into the trans-Alaska pipeline system. The Beaufort Sea oil would replace declining output from the Prudhoe Bay field. That decline is expected to begin in the latter half of the 1980's. The capacity of the trans-Alaska pipeline is not expected to constrain the production of arctic oil.

There are currently no transportation systems in existence for delivering natural gas produced in the arctic area to the lower 48 States, but several are being discussed. Current marketplace conditions in terms of gas supplies, the price paid for the gas, and the high anticipated cost of the construction of the pipeline are factors that have influenced the decision not to proceed with the pipeline.

Selected OCS Statistics

	Gulf of Mexico	*Pacific*	*Atlantic*	*Alaska*	*Total*
1954 through December 1985					
Tracts offered	56,848	1,887	9,160	8,794	76,689
Tracts leased	6,192	470	410	919	7,981
Acres leased	34,195,220	2,540,028	2,334,090	5,068,817	44,138,155
Bonuses (millions) .	$40,013	$3,911	$2,840	$5,858	$52,622
1954 through December 1985					
Number of wells drilled	23,569	805	46	61	24,481
Oil and condensate production (1000's of barrels)	6,798,818	339,745	—	—	7,138,563
Gas produced (billion cu. ft.) . . .	70,560	199	—	—	70,759
Royalties (millions) .	27,257	873	—	—	28,400

Records through December 1985

Deepest well	
off the Atlantic coast	21,872 feet
in the Gulf of Mexico	23,265 feet
off the Pacific coast	18,434 feet
Deepest water drilled off the Atlantic coast	6,952 feet
Deepest water leased off the Atlantic coast	7,755 feet
Most remote COST well	400 miles southwest of Nome in the Navarin Basin

Miscellaneous Statistics through September 1985

Miles of pipeline . .	16,001
No. of operating companies	63
Average number of bids per tract leased	2.72

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Glossary

A. TERMS

Affected State—This term is defined in specific detail in the OCS Lands Act, as amended (Section 1331(f)). For the purposes of this document, the term is defined briefly as follows:

(1) For actions pursuant to the OCS Lands Act: a State which is or may be affected by activities on the OCS. In common usage, "Affected State" means the State(s) identified by the Secretary of the Interior for consultation on OCS leasing.

(2) For actions pursuant to the CZM Act: a State whose land and water use in the coastal zone are affected by an OCS permit and/or an exploration or a development and production plan.

Area of Hydrocarbon Potential—An area which has the primary geologic characteristics favorable for the generation and the accumulation of hydrocarbons.

Bid—An offer for an OCS lease submitted by a potential lessee in the form of a cash bonus dollar amount or other commitments as specified in the final notice of sale.

Bidding System—A combination of terms and conditions under which a bid is submitted. The economic terms include, but are not necessarily limited to, (1) the minimum bid per acre, (2) the yearly rental, (3) the minimum royalty, and (4) the royalty or profit share rates imposed on future production from those tracts leased. See "Royalty."

Bidding Unit—All unleased Federal portions of 2 or more blocks whose combined acreage is 5,760 acres or less which is offered in a specific lease sale as a single leasable entity. See "Tract."

Block—A numbered area on an OCS leasing map or official protraction diagram. (See "OCS Leasing Maps and Official Protraction Diagrams.") Blocks are portions of OCS leasing maps and official protraction diagrams that are themselves portions of planning areas. Blocks vary in size, but typical ones are 5,000 to 5,760 acres (approximately 9 square miles). Each block has a specific identifying number, area, and latitude and longitude coordinates that can be pinpointed on a leasing map or official protraction diagram. See "Tract."

Blowout—An uncontrolled flow of gas, oil, or other fluids from a well to the atmosphere. A well may blow out when formation pressure exceeds the pressure overburden of a column of drilling fluid.

Blowout Preventer— An assembly of heavy-duty valves attached to the top of the well casing to control well pressure (also known as a "stack").

Bonus—Advance money offered by a bidder for the right to be awarded an oil and gas lease.

Borehole—A hole drilled in the earth's crust.

Cash Bonus—See "Bonus."

Casing—A steel pipe placed in a borehole to maintain the hole during drilling, to protect against high-pressure reservoirs, and to provide a means of extracting oil and gas.

Categorical Exclusion—A category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal Agency in implementation of the NEPA regulations and for which, therefore, neither an EIS nor an EA is required.

Coastal Zone—Coastal waters and the adjacent shorelands strongly influenced by each other. Note: the term, "Coastal

Zone" has a special meaning when the word is used in the context of CZM programs. When used in that context, "Coastal Zone" means State coastal waters and adjacent lands identified by a State in its approved CZM program.

Coastal Zone Consistency Review—Review of Federal licenses or permits and OCS plans pursuant to the CZM Act by affected coastal States to determine if the action is consistent with the State-approved CZM program. (This review can take up to 6 months to complete.)

Compliant Guyed Tower—See "Guyed Tower."

Conclusively Presumed—Assumed to be concurred in. The term relates to the concurrence by a State in an applicant's consistency certification for a plan of exploration or a plan of development and production. If a State does not comply with the time requirements of the CZM Act to notify appropriate officials of its concurrence with or objection to an applicant's certification, the MMS can presume that the State concurred with it. See "Coastal Zone Consistency Review."

Condensate—Liquid hydrocarbons produced with natural gas which are separated from the gas by cooling and various other means.

Consistency Review—See "Coastal Zone Consistency Review."

Crude Oil—A mixture of liquid hydrocarbons that exists in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities but does not include liquid hydrocarbons produced from tar sand, gilsonite, oil shale, or coal. Crude oil ranges from very light (high in gasoline) to very heavy (high in residual oil). Sour crude is high in sulphur content.

Delineation Well—A well that is drilled to determine the extent of a reservoir.

Derrick—The tower-like component of a drilling rig that supports the cables and blocks which in turn raise and lower the drill stem and bit.

Development—Activities following exploration including the installation of facilities and the drilling and completion of wells for production purposes.

Development and Production Plan— A plan submitted by industry to MMS for approval which describes activities beyond exploration until the lease expires. The activities include facility installation, drilling and production, etc.

Drawworks—The hoisting mechanism on a drilling rig. It is essentially a large winch that spools off or takes in the drilling line and thus raises or lowers the drill stem and bit.

Drillship—A self-propelled, self-contained vessel equipped with a derrick amidships for drilling wells in deep water. It may have a ship hull, a catamaran hull, or a trimaran hull.

Dynamic Positioning—A computer-activated means of maintaining a drillship or semisubmersible on location by continuous activation and control of the normal propulsion system and of specially located propulsion units called "thrusters." Dynamic positioning is normally used in waters too deep to use mooring lines and anchors economically.

Easement—See "Right of Use and Easement."

Economically Recoverable Resource Estimate—An assessment of hydrocarbon potential that takes into account (1) physical and technological constraints on production and, (2) the influence of costs of exploration and development and market price on industry investment in OCS exploration and production.

Environmental Assessment—A concise public document required by NEPA. In the document, a Federal Agency proposing an action provides evidence and analysis for determining whether it must prepare an EIS or whether it finds there is no significant impact, i.e., FONSI.

Environmental Impact Statement—A statement prepared by a Federal Agency in

compliance with NEPA for any major action that could have a significant effect on the human environment.

Exploration—The process of searching for minerals preliminary to development. Exploration activities include (1) geophysical surveys, (2) any drilling to locate an oil or gas reservoir, and (3) the drilling of additional wells after a discovery to delineate a reservoir. It enables the lessee to determine whether to proceed with development and production.

Exploration Plan—A plan submitted by a lessee that identifies all the potential hydrocarbon accumulations and wells that the lessee proposes to drill to evaluate the accumulations within the lease or unit area covered by the plan. All lease operators are required to obtain approval of such a plan by a Regional Director before exploration activities may commence.

Field—A geographical area in which one or more oil or gas wells produce. A field may refer to surface area only or to underground productive formations. A single field may include several reservoirs separated either horizontally or vertically.

Five-Year Program and Leasing Schedule—A leasing program that consists of a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity which the Secretary of the Interior determines will best meet national energy needs for the 5-year period following its approval or reapproval.

Fixed or Bottom Founded—Permanently or temporarily attached to the seafloor.

Fixed Platform/Drilling Tender Combination—A combination of a fixed bottom-founded platform and a floating tender. The platform is permanently attached to the seafloor and carries the essential drilling equipment. The floating tender is temporarily attached to the platform and carries many of the accessories.

Formation—A bed or deposit composed of substantially the same kinds of rock. Each different formation is given a name, frequently as a result of the study of the formation outcrop at the surface and sometimes based on fossils found in the formation.

Formation Fracture Gradients—Pressure per unit depth at which the formation rocks will fail causing interconnecting cracks to form in the rock beds with resultant penetration of the formation by wellbore fluid.

Gas Hydrates—Icelike structures of gas and water in which gas molecules are trapped within a framework or cage of water molecules.

Guyed Tower—A relatively slender trussed steel column of constant cross section which supports one or more decks. The tower is held in place by guylines extending radially from the top of the tower to clump weights and anchors on the ocean floor. The tower is designed to move with environmental forces rather than resist them.

High-cost Gas—Gas that would cost more to produce than would normally be expected such as gas produced from below 15,000 feet or gas produced from certain designated tight formations.

Hydrate Zone—The formation or formations containing gas hydrates. See "Gas Hydrates."

Hydrocarbon—Any of a large class of organic compounds containing primarily carbon and hydrogen. Hydrocarbons include crude oil and natural gas.

Hydrocarbon Potential—See "Area of Hydrocarbon Potential."

Jacket—See "Steel-jacketed Platform."

Jack-up Unit—An offshore drilling structure with tubular or truss legs that support the deck and hull. When positioned over the drilling site, the leg bottoms rest on the seafloor. A jack-up unit is towed or propelled to a location with its legs up.

Lease—A contract authorizing exploration for and development and production of minerals for a specified period of time over a given area. The meaning of "lease" depends upon its use in context.

Lease Operator—See "Operator."

Lease Sale—An MMS proceeding by which leases for certain OCS tracts are offered for sale by competitive sealed bidding and during which bids are received, announced, and recorded.

Lease Term—Duration of a lease. Oil and gas leases are issued for an initial period of 5 years or not to exceed 10 years where such longer period is necessary to encourage exploration and development in areas because of unusually deep water or other unusually adverse conditions. Once production is reached, the term continues as long as there is production.

Leasing Map—See "OCS Leasing Maps and Official Protraction Diagrams."

Lessee—A person or persons to whom a lease is awarded; the recipient of a lease. See "Operator."

Manifold—An accessory system of piping to a main piping system (or another conductor) that serves to divide a flow into several parts, to combine several flows into one, or to reroute a flow to any one of several possible destinations.

Minimum royalty—The lowest payment a lessee must pay on a Federal or Indian lease after production begins. It is equivalent to the yearly rental, typically $3 per acre or $8 per hectare (offshore). Rentals are paid annually before a discovery; royalties are paid on production after a discovery. If the total royalty payments amount to less than the yearly rental, the minimum royalty payments make up the difference. See "Royalty."

Mobile Offshore Drilling Unit—A drilling vessel that floats upon the surface of the water when being moved from one location to another. It may or may not float once drilling begins. Mobile units include jack-up drilling units, semisubmersibles, submersibles, and drillships.

Mud—The liquid circulated through the wellbore during rotary drilling and workover operations. In addition to its function of bringing cuttings to the surface, drilling mud cools and lubricates the bit and drill stem, protects against blowouts by holding back subsurface pressures, and deposits a mud cake on the wall of the borehole to prevent loss of fluids to the formation.

Natural Gas—A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in gaseous phase at the surface or in solution with crude oil in natural underground reservoirs at reservoir conditions.

Net Profit Share—A bidding system for leasing tracts on the OCS that uses the cash bonus as the bid variable and requires a fixed annual rental payment and net profit share payments at a fixed percentage rate that is constant for the duration of the lease.

Nonenergy Minerals—All minerals other than oil, gas, and sulphur.

Notices to Lessees and Operators—The MMS documents used to distribute information to lessees and operators. The NTL's may be issued for several reasons, e.g., providing an interpretation of a regulation or transmitting administrative information such as a change in an MMS office address.

OCS—See "Outer Continental Shelf."

OCS Leasing Maps and Official Protraction Diagrams—Basic geographical records; maps used in lease sales. Leasing maps are used in the Gulf of Mexico (nearshore Texas and Louisiana) and in small areas offshore California. Leasing maps are developed on the basis of extensions of the leasing grids used onshore. Most of the offshore area is mapped on official protraction diagrams (OPD's) using the Universal Transverse Mercator grid system. Each OPD covers 1° latitude by 2° longitude (except for offshore Alaska which is 1° latitude by 3° longitude) and is divided into blocks. See "Block."

Each leasing map or OPD bears a distinct alphanumeric number and in most cases a name based on onshore land features, a nearby city or town, or the hydrographic features contained within the limits of the

diagram. Shoreline detail is also depicted on the OPD when it falls within the limits of the particular diagram.

Operator—The individual, partnership, firm, or corporation having control or management of operations on a leased area or a portion thereof. The operator may be a lessee, designated agent of the lessee, or holder of rights under an approved operating agreement.

Outer Continental Shelf—The part of the continental shelf beyond the line that marks State ownership; that part of the offshore lands under Federal jurisdiction. (For the definition that is in the OCS Lands Act, see the chapter on Statutory and Regulatory Authority.)

Permafrost—Permanently frozen subsoil in arctic or subarctic regions.

Permeability—The measure of a rock's ability to transmit fluids; a measure of the ease with which fluids can flow through a porous rock.

Plan of Development and Production—See "Development and Production Plan."

Plan of Exploration—See "Exploration Plan."

Planning Area—A subdivision of an offshore area used as the initial basis for considering blocks to be offered for lease in the DOI's areawide offshore oil and gas leasing program.

Platform—An offshore structure built on pilings from which offshore wells are drilled, produced, or both.

Platform--Guyed Tower. See "Guyed Tower."

Platform--Steel Jacketed—See "Steel-Jacketed Platform."

Porosity—The ratio of the holes, voids, or pores in a rock to its total volume or size.

Production—The phase of oil and gas operations involved with well fluids extraction, separation, treatment, storage, measurement, and (sometimes) transportation.

Proprietary Information— Geologic and geophysical data, information, and derivatives thereof that cannot be released to the public for a specified term because of Federal law, regulations, or statutes, or because of contractual requirements.

Qualified Bidder—A bidding entity or person who has met the appropriate requirements of 30 CFR Part 256, Subpart G, and of the notice of sale.

Reserves—A discovered resource. That portion (in barrels or cubic feet) of an identified oil or gas resource which can be economically extracted using current technology.

Reservoir—A subsurface, porous, permeable rock body in which oil or gas or both are stored.

Resources—Concentrations of naturally occurring solid, liquid, or gaseous materials in or on the Earth's crust. These include both identified (discovered) and undiscovered resources. See "Undiscovered Recoverable Resources."

Rig—The derrick, drawworks, and attendant surface equipment of a drilling or workover unit.

Right of use and easement—For the OCS, a right of use and easement usually refers to the authorization by MMS to a lessee for the construction and maintenance of a pipeline or other structure on OCS lands not subject to the lessee's lease.

Right-of-way—For the OCS, a right-of-way usually refers to the authorization by MMS for the construction and maintenance of a pipeline and associated structures on the OCS.

Riser pipe—The pipe and special fittings used on floating offshore drilling rigs to establish a seal between the top of the wellbore, which is on the ocean floor, and the drilling equipment located above the surface of the water. A riser pipe serves as a guide for the drill stem from the drilling vessel to the wellhead and as a conductor of drilling fluid from the well to the vessel. The riser consists of several sections of pipe and includes special devices to compensate for any movement of the drilling

rig caused by waves. Further, pipelines for transporting hydrocarbons necessarily have "riser pipes" connecting the pipeline from the sea floor to the platform production deck. A riser pipe is also called a marine riser.

Riser system—See "Riser Pipe."

Royalty—A share of the minerals produced from a lease; a percentage of production either in money or in kind which a lessee of a Federal or Indian lease is required to pay. See "Royalty-in-kind."

Royalty-in-kind—A payment by a lessee in crude oil rather than in cash for the amount of royalty due the Federal Government as the Federal Government's share (per the lease contract) of the extracted oil and gas. (The Federal Government then sells the crude oil to eligible refiners who in turn pay for the value of the oil in the form of a monetary payment.)

Sale Area—The grouping of whole and partial blocks within a specific planning area being offered for sale.

Scoping— A "reaching-out" process intended to involve all interested persons and groups (Federal and non-Federal) in determining issues, areas, and alternatives to be studied in the EIS.

Semisubmersible—A floating offshore drilling structure that has hulls submerged in the water but not resting on the seafloor.

Shut-in—To close the valves on a well classified as a producer. However, the well may be awaiting a workover or abandonment due to its condition.

Single-Point Mooring—Offshore anchoring and loading or unloading point connected to shore by an undersea pipeline; used in areas where existing harbors are not deep enough for laden tankers. It is also used in connection with subsea production.

Steel-Jacketed Platform—A conventional steel tower supporting one or more decks on which drilling and production equipment is mounted. The tower consists of welded steel tubular members; it increases in horizontal cross section from top to bottom. The steel-jacketed platform is connected to the ocean floor by piles driven through the legs and grouted with cement in the space between the pile and the jacket. The platform is designed to resist environmental forces.

Stipulations—Specific measures imposed upon a lessee that apply to a lease. Stipulations are attached as a provision of a lease; they may apply to some or all tracts in a sale. For example, a stipulation might limit drilling to a certain time period of the year.

Strategic and Critical Minerals—Minerals that (1) would be needed to supply the military, industrial, and essential civilian needs of the United States during a national defense emergency, and (2) are not found or produced in the United States in sufficient quantities to meet such needs.

Sundry Notice—A form used by a lessee for requesting approval from MMS for specific work on a well such as cleaning out sand or treating with acid to increase production.

Suspension of Operations or Production—An authorized temporary cessation or prohibition of activities on a leasehold. As of the effective date of a suspension, time on a lease stops for the life of the suspension, thus having the effect of extending the term of a lease for a period of time equal to the length of time of the suspension.

Tender—A barge or small ship serving as a supply and storage facility for an offshore drilling unit; a supply ship.

Term—See "Lease Term."

Tract—A designation assigned for administrative and statutory purposes to a block or combination of blocks that are identified on a leasing map or an official protraction diagram prepared by MMS. A tract may not exceed 5,760 acres unless it is determined that a larger area is necessary to comprise a reasonable economic production unit. See "Leasing Map," "Block," and "Bidding Unit."

Trans-Alaska Pipeline—A 48-inch-diameter pipeline, 800 miles long, completed in

1977, that transports crude oil from the Alaskan North Slope to the icefree port of Valdez.

Underwater Manifold—See "Manifold."

Unitization—A process by which two or more leases are joined together through an agreement to act as one. For example, leases may be unitized for the efficient development and production of a reservoir that lies beneath more than one lease.

Well Completion—The activities following the drilling phase to place a well in a production status.

Well Workover—See "Workover."

Workover—Operations on a shut-in or producing well to restore or increase its production.

B. Abbreviations and Acronyms

ACT—automatic custody transfer

API—American Petroleum Institute

APD—application for permit to drill, deepen, or plug back

BAST—best available and safest technologies

BLM—Bureau of Land Management

CFR—Code of Federal Regulations

CIDS—concrete island drilling system

COE—U.S. Army Corps of Engineers

COST—continental offshore stratigraphic test

CVA—certified verification agent

CZM—coastal zone management

DOC—Department of Commerce

DOD—Department of Defense

DOE—Department of Energy

DOI—Department of the Interior

DOJ—Department of Justice

DOT—Department of Transportation

DST—deep stratigraphic test or drill stem test, depending on context

EA—environmental assessment

EEZ—Exclusive Economic Zone

EFT—electronic funds transfer

EIS—environmental impact statement

EPA—Environmental Protection Agency

ER—environmental report

FERC—Federal Energy Regulatory Commission

FY—Fiscal Year

FWS— U.S. Fish and Wildlife Service

FONSI—finding of no significant impact

INC—incident of noncompliance

MER—maximum efficient rate

MMS—Minerals Management Service

MOU—memorandum of understanding

MPR—maximum production rate

NEPA—National Environmental Policy Act

NGPA—Natural Gas Policy Act

NMFS—National Marine Fisheries Service

NOAA—National Oceanic and Atmospheric Administration

NPDES—National Pollution Discharge Elimination System

NPS—National Park Service

NTL—Notice to Lessees and Operators

OCS—Outer Continental Shelf

OCSIP—Outer Continental Shelf Information Program

OHMSETT—Oil and Hazardous Materials Simulated Environmental Test Tank

OMM—Offshore Minerals Management

OPD—official protraction diagram

PINC—potential incident of noncompliance

RM or RMP—Royalty Management Program

RTWG—regional technical working group

SID—secretarial issue document

TLP—tension-leg platform

USCG—U.S. Coast Guard

USGS—U.S. Geological Survey

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.

S CARD

OFFICE	DATE RETURNED

(Continued on reverse)